KNICKERBOCKER MIXERS

The Hubbard-Floyd Co., Inc.,
167th St. and Sedgwick Ave.,
NEW YORK - - N. Y.

Knickerbocker

CONCRETE, MORTAR, PLASTER AND MASTIC MIXERS

CONTRACTORS' SAW RIGS

Sold under a definite Pledge of Successful Performance. See page 36.

Catalog No. 29

The KNICKERBOCKER COMPANY
Eſtablished 1883
JACKSON, MICHIGAN

Knickerbocker Mixers

Manufactured for Discriminating Contractors Who Think in Terms of Mixer Performance

EVER since the Knickerbocker Company first started building mixers in 1903, the design of the machine has originated on the construction job rather than on the drafting board.

It has been the job of the white-collar engineer to devise simple, effective means for expressing in a blueprint the practical ideas of the engineer in leather boots who is up against the stern realities of pouring into forms a quality of concrete that would resist all the assaults of time and stress, at a cost that would pay the contractor for his hire.

Every improvement that has been made in Knickerbocker Mixers has been suggested by field experience. Every change in design has been withheld from current models so it could be given practical trial in actual construction work—it has been made to earn its place on a Knickerbocker.

For instance, the increasing practice of the water-cement ratio theory in proportioning concrete made new demands upon concrete mixers. Knickerbocker engineers met these demands by important changes in drum design and by an improved method of measuring accurately the amount of water introduced into the drum.

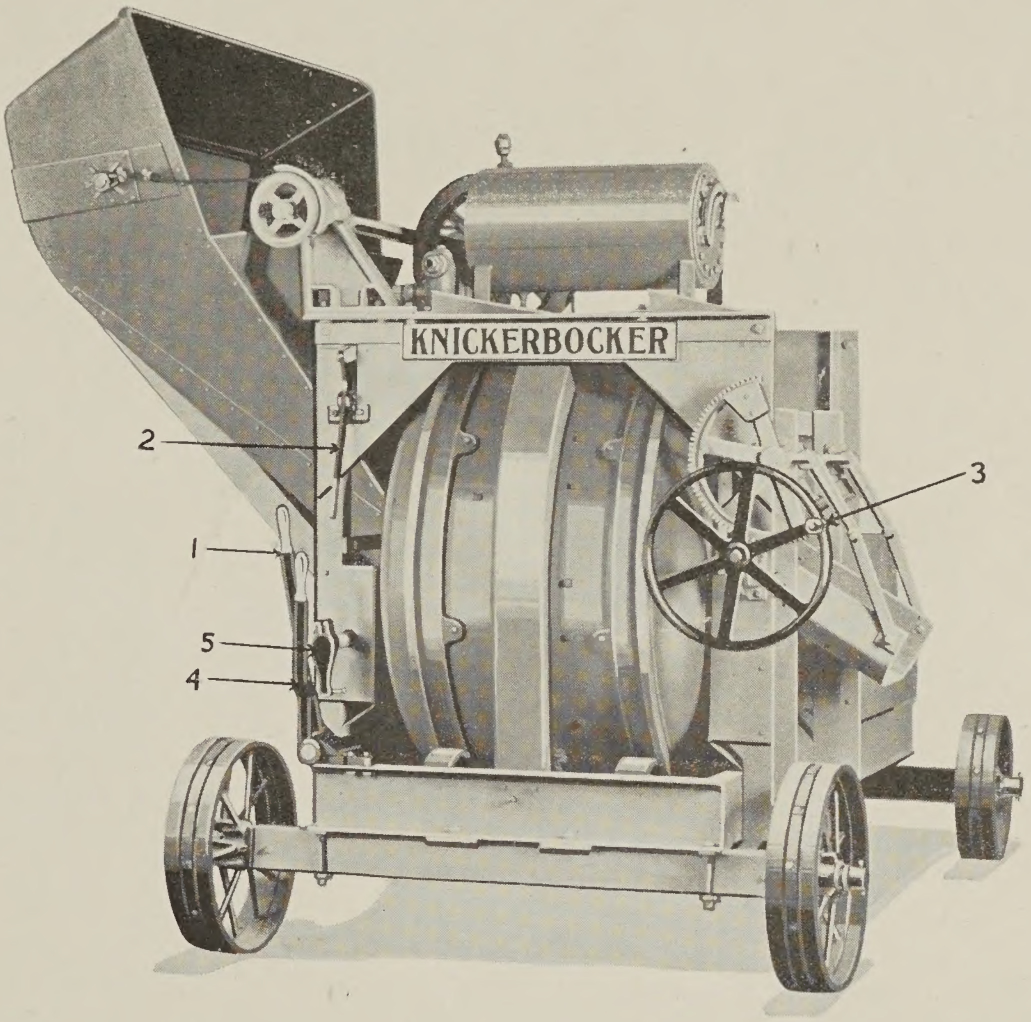
Concrete of sticky consistency, given a longer mixing, presented serious problems to the contractor. On pages 8 and 9 of this book will be found the details of Knickerbocker design which enable the contractor to meet stiffened specifications and still make reasonable pouring records and as a consequence show a profit on his work.

Mounting labor costs have forced contractors to use mechanical aids wherever possible. Knickerbocker engineers have simplified mixer control so that mixer operators, with no added effort, do more work. On the opposite page you will see how every mixing operation is conveniently governed by the operator from his position in sight of the discharge end—how these controls are sturdily and simply incorporated in the mixer design in a manner to insure smooth and constant operation.

Perhaps the most important improvement in the Knickerbocker Line is the policy of unit construction. Knickerbocker mixers are not built—they are *manufactured.* The manufacture of each unit—the power shaft unit, the trunnion roller assembly, the loader unit, for instance—is in the hands of specialists in various departments. These units, manufactured in quantities with the aid of the most improved jigs and tools, are each a finished, carefully inspected product before they are made available for final assembly. When these units reach the assembly line each represents the very best manufacturing experience and they are assembled into a mixer that completes the engineer's conception and meets the contractor's need.

Knickerbocker frames are all drilled to receive various optional equipments. This is especially important in the larger sizes on which the owner may want to make field changes, substituting a batch hopper for a power loader, for example.

In every detail of design and construction, the Knickerbocker shows evidence of a desire to give the contractor maximum effective performance. The Knickerbocker's ability to deliver uninterrupted service with minimum upkeep cost is indicated by its selection by so many large concerns doing an equipment rental business. No effort has been made to trim quality to meet a price. Every endeavor has been put forth to supply to the construction field a line of mixers that will do their jobs well and continuously and with minimum attention.



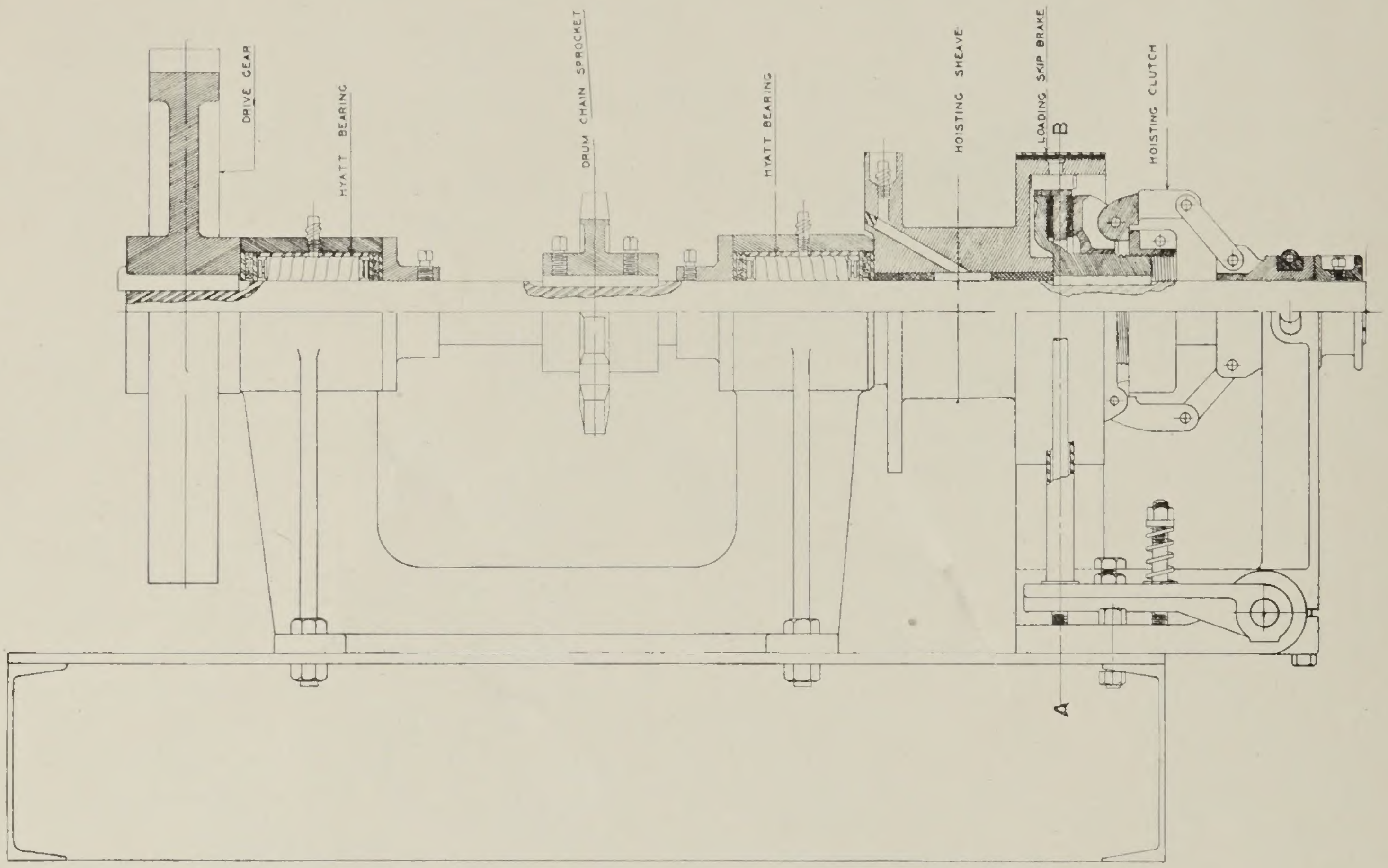
Control

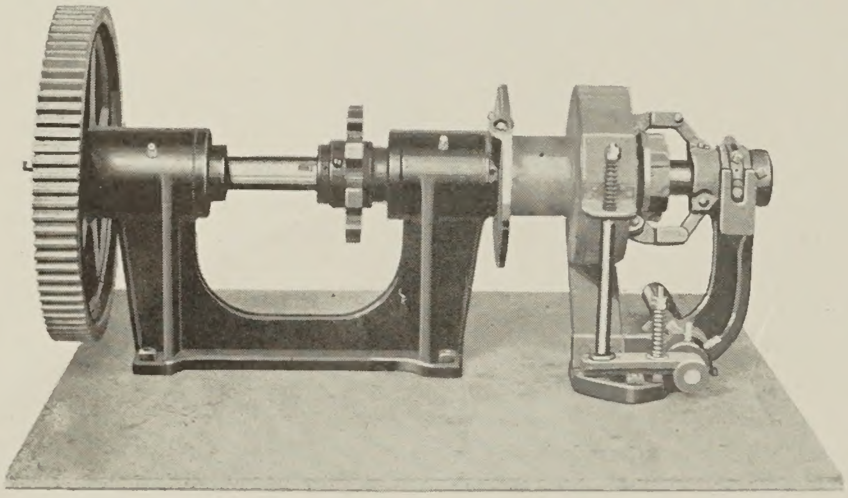
CENTRALIZED control from the drum-end of the machine has a three-fold advantage. It reduces the size of the mixing crew, it makes fast charging and discharging possible and, because the operator handles the discharge chute and can see every wheeler, it insures uniform barrow and cart loads.

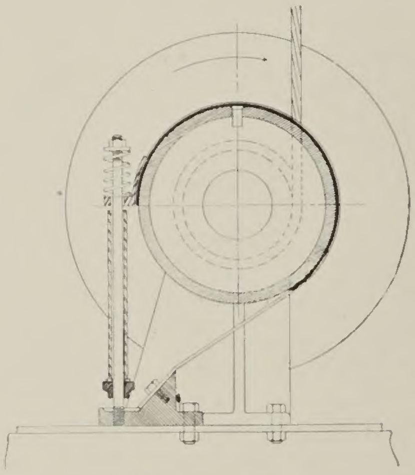
The Knickerbocker not only presents a convenient grouping of control levers but, by important refinements of design, has placed each lever on hair trigger. A mere touch and the lever functions.

When the loader is filled the operator pulls lever No. 2 which admits an accurately measured weight of water to drum. This cleans the drum and results in a faster mix. A touch of clutch lever No. 1 starts the loading skip up.

When the loader reaches a 50-degree pitch the adjustable knock-out (No. 5) throws out clutch lever No. 1, automatically releases the loader clutch and engages the loader brake. No chance for the skip to jam the frame—no chance for it to drop prematurely. When the skip is empty the operator lowers it by the brake lever No. 4. The easy-running hand wheel No. 3 operates the discharge chute.



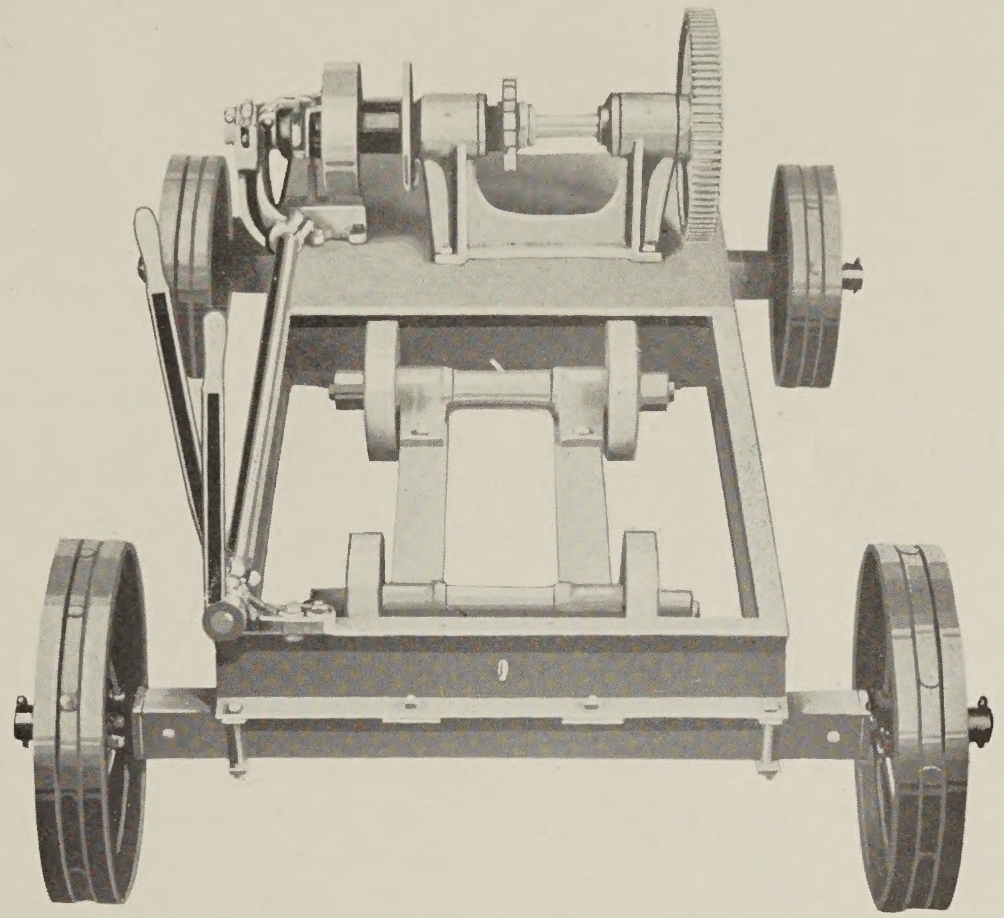


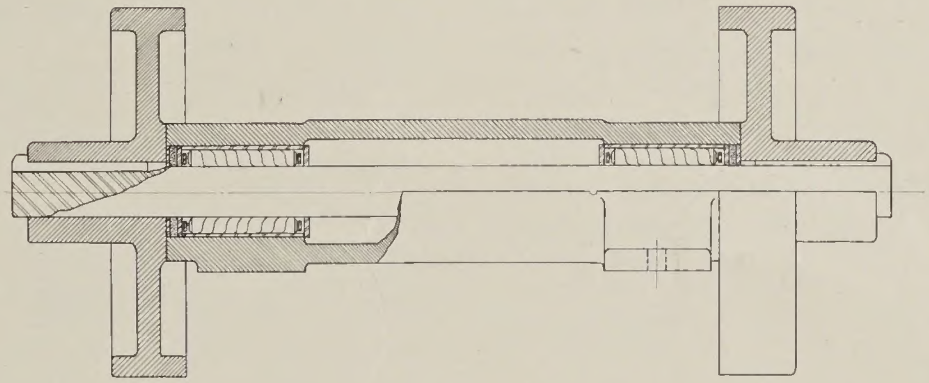


Section through A-B
(Scale reduced)

Power Shaft Assembly

THE power shaft assembly on the new 7-S, 10-S and 14-S Knickerbockers represents a most important step forward in mixer design. The bearings are housed in a one-piece casting, including shaft brackets and base, all cast integrally and line-bored and reamed on a horizontal mill. This construction places the Hyatt roller bearings in perfect alignment and keeps them there throughout the life of the mixer. Dot lubricating system is used.





Trunnion Rollers

THE trunnion rollers are equipped with Hyatt roller bearings, housed in a one-piece cast housing horizontally bored as in the case of the power shaft. The housing has ample capacity for grease to lubricate the bearings for long periods without attention.

No flange has ever worn or broken from a Knickerbocker mixer. The flanges, instead of being on the trunnions, are on the cast semi-steel drum track, where a more extended bearing area distributes the wear.

The car-wheel type rollers are chilled, hardened and ground to absolute round. Keyed to the shaft, they revolve at uniform speed—shifting of the drum load does not affect the rate of wear.

The trunnion shafts are high carbon turned and polished steel. The whole trunnion roller assembly, as will be seen above, is one self-contained unit, making field replacement easy.

Power Plant Details

Clutches

A MULTIPLE disc clutch operates the loading skip. This clutch is outside the bearing, easily accessible. Easily operated and simply adjusted, it never fails to take hold positively. Loader delays are eliminated, daily production is kept at a high figure.

Between engine and power shaft a twin-disc automobile-type clutch is used and is a built-in feature of the engine.

Machine-Cut Gears

The Knickerbocker power shaft is driven by a machine-cut gear, thus assuring smooth, quiet performance. The driving pinion is a cut steel gear. A gear drive at this point, where the speed is high and where the centers remain fixed, transmits the engine power positively and effectively.

Drum Drive

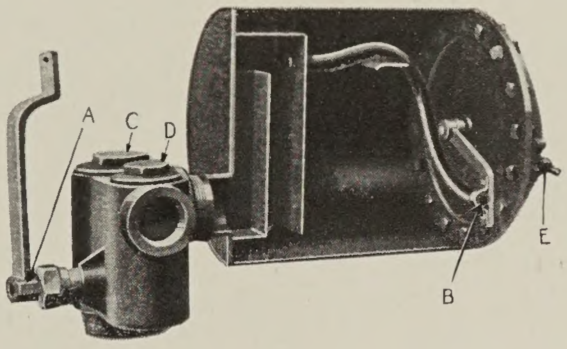
In driving the drum a heavy case-hardened steel roller chain is used, because of the comparatively low speed. If a chip or a pebble lands on a trunnion, the position of the drum is subject to a temporary shift of position. The chain adapts itself to these changed conditions, whereas on a gear-driven drum, the breaking of a gear tooth is a far more serious matter.

The drive sprocket on the countershaft is chilled, and the drum sprocket is made in segments so that only one section need be replaced should a break occur.

A decided advantage of Knickerbocker design is that the trunnion roll bearings are cradled upon longitudinal supports, which are not directly connected with the side sills of the truck frame and, therefore, are not affected by any strain or stress set up by the action of the loading skip, non-level setting up of the mixer, or wrenching occasioned by moving the machine over uneven ground.

Truck Frames

A thousand difficulties are avoided by a sturdy, vibrationless frame. Knickerbocker frames (shown on page 5) are virtually one piece, as each is built up of heavy structural steel channels, arc-welded and reinforced with steel gussets. The frame rests directly upon axles built up of heavy channels. It is important to know that on every Knickerbocker model, even with the extreme drum diameter, the center of gravity is kept so low that the machine is always stable and *bracing is never necessary*. See detailed specifications on page 25 for weights and dimensions.



The Knickerbocker System of Accurate Water Control

WITH the universal acceptance of the water-cement ratio theory, mixer operators are confronted with a new problem in connection with the production of specification concrete. Water and cement must be accurately measured and this accuracy of measurement must be maintained for each batch.

Cement is easily measured—the standard sack of cement always weighs 94 pounds—so the real problem remaining is the accurate measurement of water introduced per batch. This means that the moisture content of the aggregate must be first determined and allowance made for it, and that the water introduced per batch must be the right quantity. Beyond this the water must be introduced quickly and with no dribble or valve leakage.

Several years of intensive laboratory and field experiment on the part of Knickerbocker engineers have evolved a water measuring device that meets these exacting requirements. The Knickerbocker accurate measuring water tank has these qualifications:

It measures water with an extreme degree of accuracy.

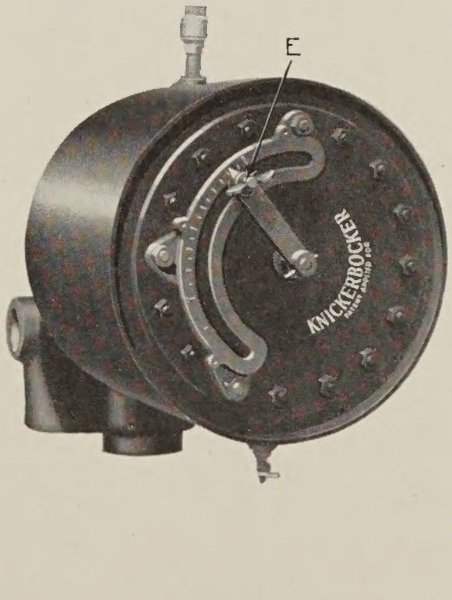
It delivers it to the drum quickly, due to the 3 inch outlet valve and pipe.

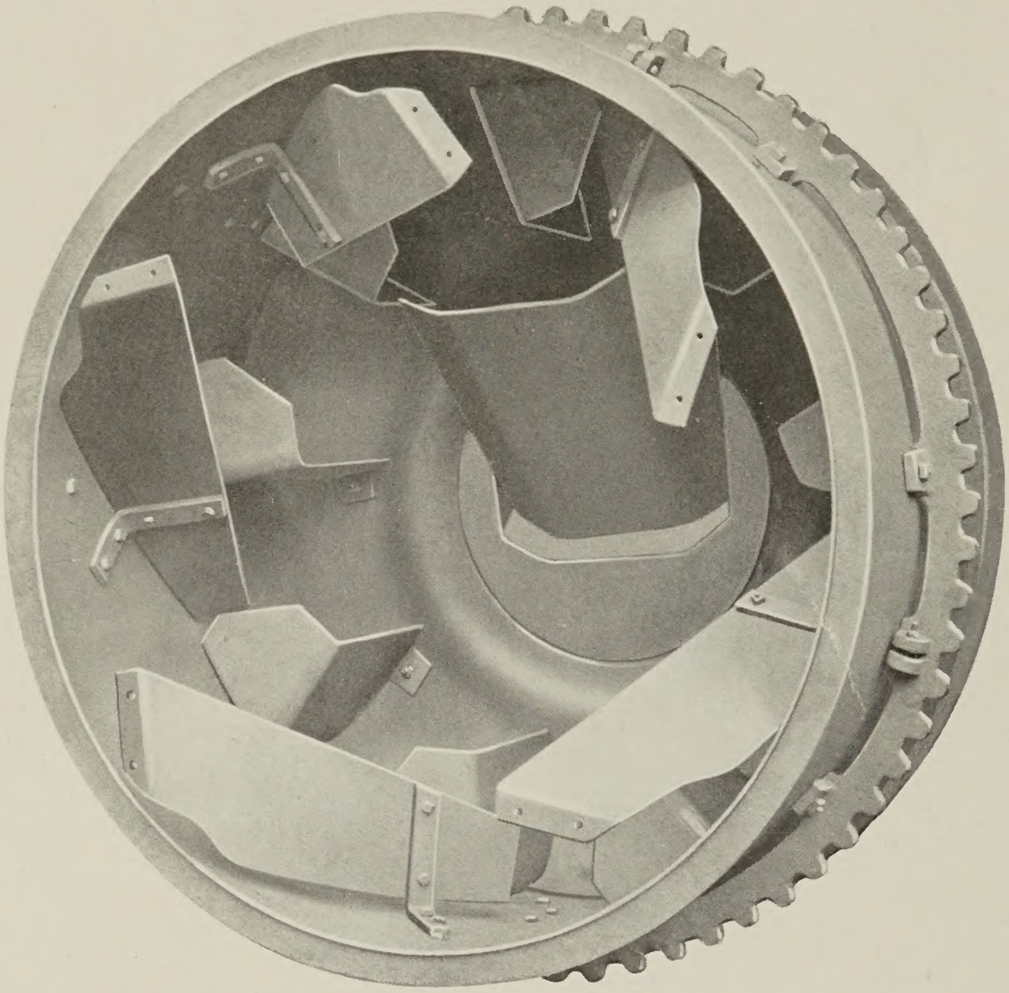
It refills quickly because of the 2 inch inlet valve (allowing more than one hose to be used in case of low pressure at the source).

The rugged, simple design and construction of both tank and valve insure long life and total absence of trouble in operation.

Operation of the device is simple. Lever "A" thrown to the right allows water to flow through the 2-inch inlet valve "D," filling the tank completely. When the tank is full the check valve on top closes, and the tank is under pressure. Throwing lever "A" through 30° closes inlet valve and opens the 3-inch outlet valve "C," allowing the water to syphon quickly from the tank, due to the large valve, until the level of the water inside the tank reaches the open end of flexible measuring tube "B," when air is drawn into the top of the syphon and the suction is broken. With the breaking of the suction the flow of water ceases, and no dribble can possibly occur. Measuring tube "B" can be moved through an arc of 180°, from top to bottom of tank, and can be set at any desired point by means of a wing nut on the pointer "E" on the rear of tank.

Valves are of poppett type, made easily accessible by large caps; valve seats are raised to prevent sediment from interfering with their correct operation. Access to tank is by means of the removable rear head. Tank shell is of $\frac{3}{16}$-inch steel, while heads are $\frac{3}{8}$-inch plate, and the tank and valves are carefully tested under 150 pound hydrostatic pressure. Flexible tube "B" is 9-ply and not affected by heat, cold or any non-freeze solution that may be used.





The Knickerbocker Drum

THE most important recent development in the science of the design of concrete mixers has been the discovery of the relation of the water-cement ratio to the ultimate strength of the concrete. The practice of the water-cement ratio theory involves the manufacture of a workable concrete, a *plastic* concrete.

It is in the mixing drum that the contractor must secure that careful mixing of materials that will give the engineer a concrete of the required "stickiness." Therefore, all auxiliary functions of charging and discharging are futile unless the drum is properly designed to do the major job of mixing.

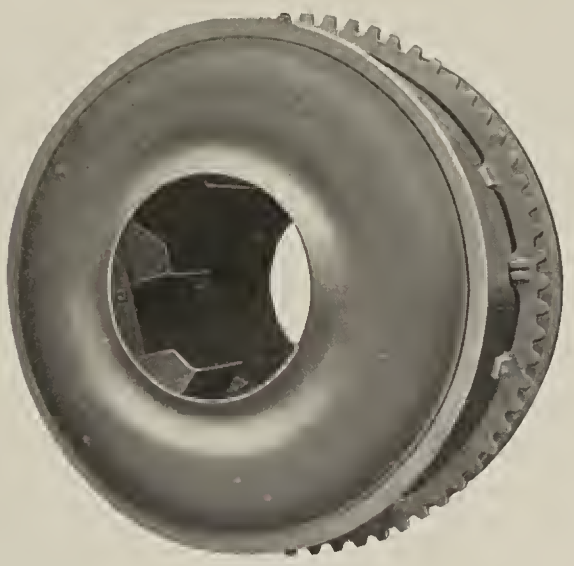
Construction engineers are responsible for the larger drum diameters on the new Knickerbockers. Higher drums make possible larger drum openings to speed loading and discharging and allow for proper bucket and blade combinations to give rapid and thorough mixing.

In the drum shown above the .30 – .40 carbon steel buckets and blades manipulate the batch by tumbling and kneading the aggregates, folding the mix over on itself. In mixing position, the discharge chute catches the falling batch, and throws the mix back across the drum for remixing.

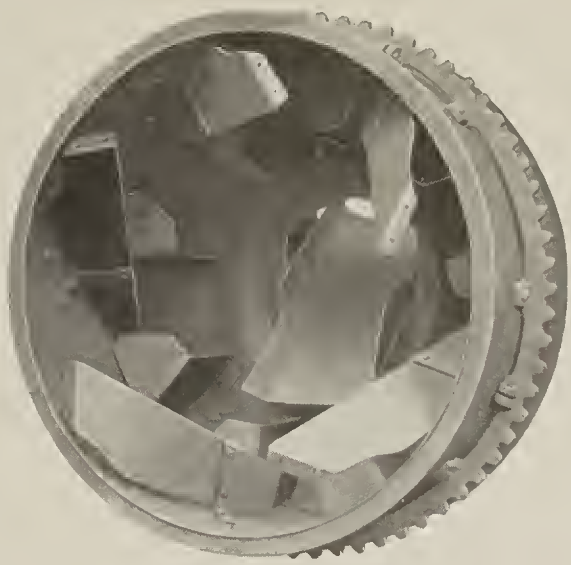
Clogging of concrete in blades is prevented by giving the blades clearance from the drum shell. Sharp pockets are eliminated and drum may be completely flushed.

Detailed specifications in this catalog indicate that on each size of the Knickerbocker the drum shell is of ¼-in. .30 – .40 carbon steel to which are welded the bulging heads, pressed from the same weight of steel stock.

Drum tracks, of semi-steel, are riveted to the shell. The drum with the tracks in place is then put upon a vertical mill where at one setting the wearing surfaces are turned to true circles in perfect alignment, thus assuring a smooth-running drum before it ever rests on the trunnions. *This construction makes field replacement of drum tracks simple and low in cost, if ever necessary.*



Pressed Steel Drum



Mixing Position of Discharge Chute

Rapid Discharge

FACED by the requirement of longer mixing, the contractor must, to maintain his output, save time getting the materials into the drum and out again.

The solution of the first problem is explained on page three. The second problem is solved through the medium of an extraordinarily large opening on the discharge side, permitting the use of a very wide discharge chute, and also through the employment of an unusual number of large blades and buckets, which not only increases the speed of mixing, but also increases the speed with which the concrete is deposited upon the discharge chute when the drum is being emptied.

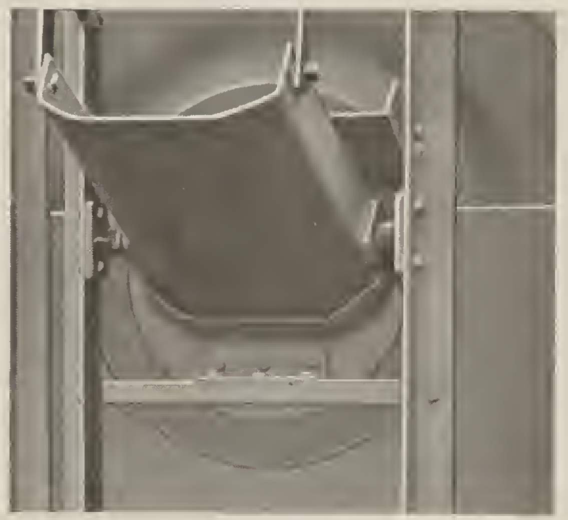
The combination of such a discharge chute and bucket capacity empties the drum almost instantly and adds to the mixing efficiency of the drum type of mixer, the rapid discharge hitherto enjoyed only by the tilting type mixer.

Because of the unusual records Knickerbocker mixers have made in time of discharge, it is tempting to give some record run as a standard discharge time. Such records however might be exceedingly misleading, on account of the varied character of aggregate and the varied conditions of receiving the mixed aggregate, which naturally affect the time of discharging a batch. To judge discharging time satisfactorily put a Knickerbocker on your job and compare its performance with that of any other mixer.

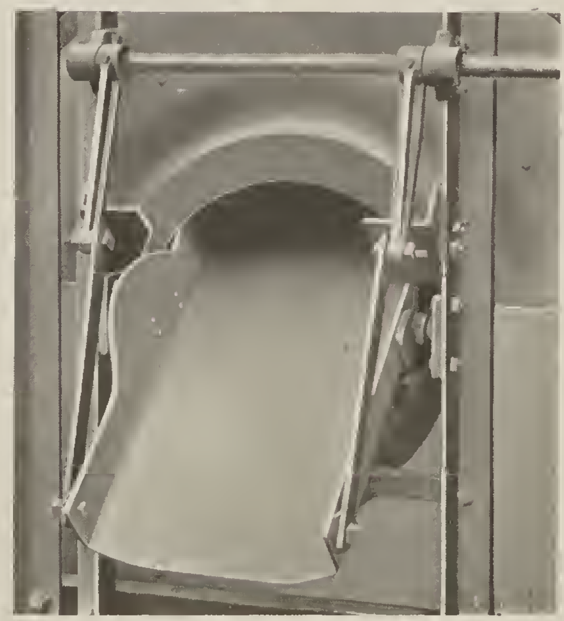
Slop Guards

Every Knickerbocker has under the discharge chute, fitting closely inside the drum and securely fastened outside the drum, a steel plate filling the lower part of the drum opening and preventing materials from splashing out while mixing.

Both charging and discharge openings are supplied with cast flanged opening rings, machined on their inner surfaces. The slop guard fits against this machined surface, and any abrasion between the two is taken up by the cast ring, instead of going directly to the pressed steel head. Opening rings are easily replaced, should the occasion arise. Fitting under the outer flange is a heavy sheet steel splash apron, which shields the drum, drum tracks and trunnion roll assemblies.



Slop Guard



The Steep-Pitch Discharge Chute

How the Knickerbocker Eliminates Trouble

Cable Sheaves

Cable Sheaves

SPIRALLY grooved sheaves protected by a close-fitting machined guard eliminate the danger of the loading skip cable jumping and reduce cable wear. The cable can neither pile up nor slip. The cone shape places minimum load on the engine as the loader starts up, starting is easy and the loader gains speed gradually as it rises. Power is thus economized.

Two independent cables are used, with equal strain on both. This is an important safety feature because, if one cable should fail the remaining cable will safely support the load.

Automotive Steering

This automotive steering device permits sharper turning and safer towing. It consists of hinged steering knuckle axles, controlled by a large U-shaped fifth wheel and steering rods. The assembly includes trailer type spring hitch. The device is available as an extra on all 7-S, 10-S and 14-S models.

Automotive Steering

Sub-Hopper

This steel-plate sub-hopper at the charging opening of the Knickerbocker drum has two important advantages. It keeps the lip of the loader outside the drum so that it does not become clogged with wet concrete; and it makes it possible to elevate the loader to an angle of 50 degrees for rapid charging of the drum. It is never necessary to jerk the Knickerbocker loader or to pound it. The most that is required is to scrape out occasionally with a shovel such small amounts of material as may have continued to remain in the skip.

If you don't start beating the loading skip, you'll never have to do it.

Wheels

Steel tired wheels are standard equipment—see specifications on page 25 for sizes.

The rubber tired wheels, complete with roller bearings, are furnished as extra equipment of the 7-S and 10-S mixers.

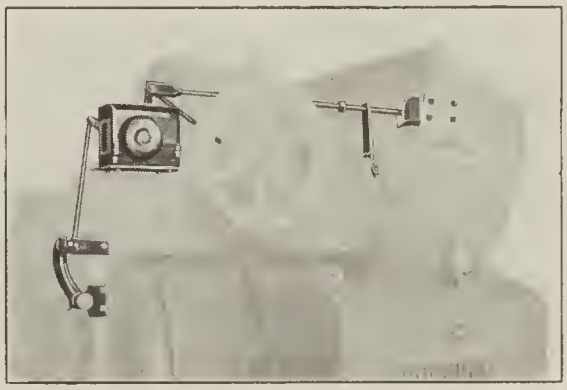
Wheels

Batch Meter

To meet the present day demand for accuracy in mixing time as well as in the measurement of materials, specifications in a growing number of instances call for a batch meter.

The batch meter illustrated here, which may be had on the Knickerbocker 7-S and 10-S mixers, automatically locks the discharge chute as soon as the drum receives the material and the chute is not permitted to discharge until the full specified mixing time has elapsed. Then the discharge chute is automatically released and a signal bell indicates its release. The meter may be set according to any specified mixing time.

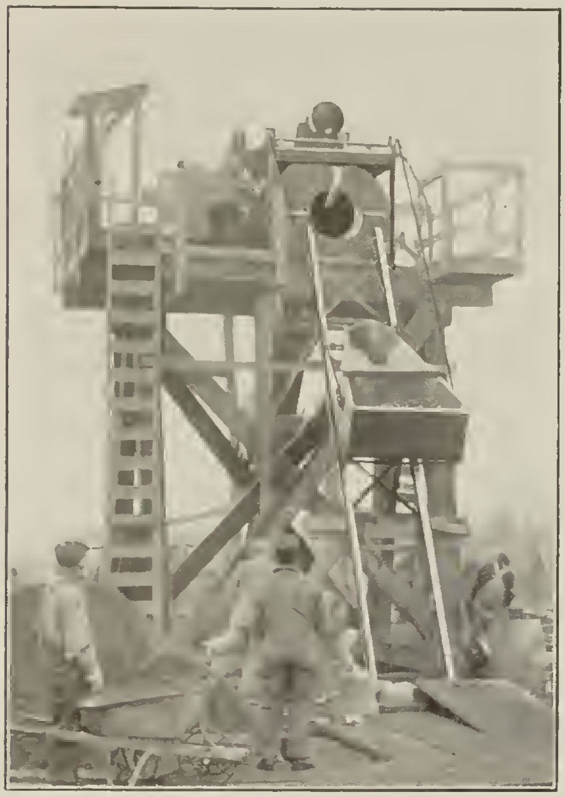
A larger meter of similar design, which operates as described above, may be had on Knickerbocker 14-S, 21-S and 28-S mixers.



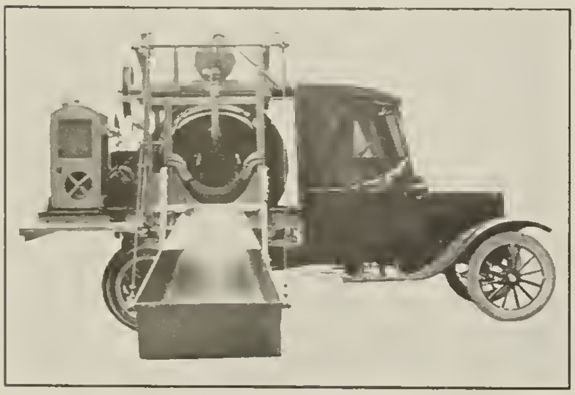
Batch Meter

Uninterrupted Water Supply

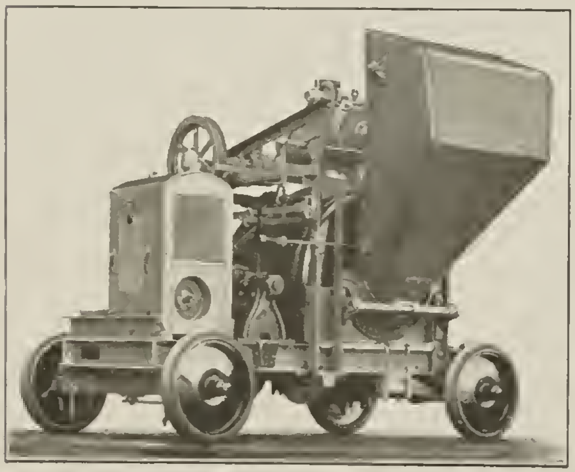
When your job is so located as to make water pressure unavailable, you can attach to your Knickerbocker at small cost a rotary force pump that will furnish adequate water supply. A relief valve automatically diverts surplus water from one chamber of the pump to the other without drawing additional water until the tank pressure is reduced. Removal of handy plug drains pump to prevent freezing.



Extended Loader Track



Ford Truck Mounting



On Spring Suspension Truck

Special Mountings

Special equipment is furnished for the special needs of contractors. For instance, when for any reason it makes a more efficient plant layout to mount the mixer at a level considerably above the level at which materials are delivered, an extension track can be furnished for the power loader. This often eliminates a tower and chute arrangement by hoisting the materials before mixing rather than after.

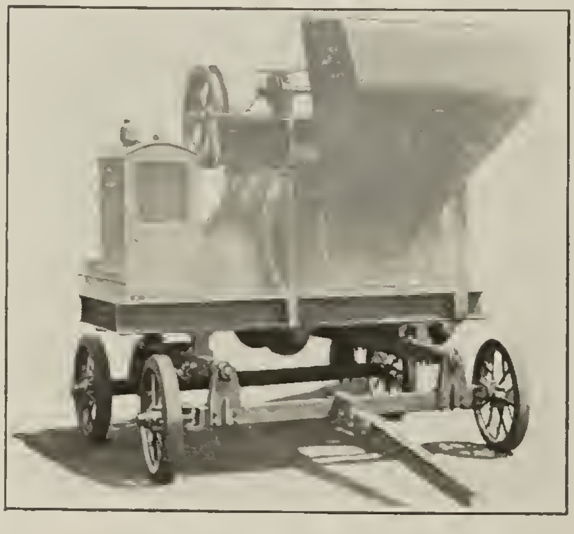
Extension tracks, furnished in 4′, 6′ and 8′ sections, are readily attached to any Knickerbocker in the field as all frames are drilled at the factory. All bolts, nuts and washers come with the track and installing it is a simple job.

To facilitate rapid movement of mixers from job to job, machines may be mounted on an automobile truck chassis, or on semi-elliptical springs with Timken roller bearings in the rubber-tired wheels, as illustrated here.

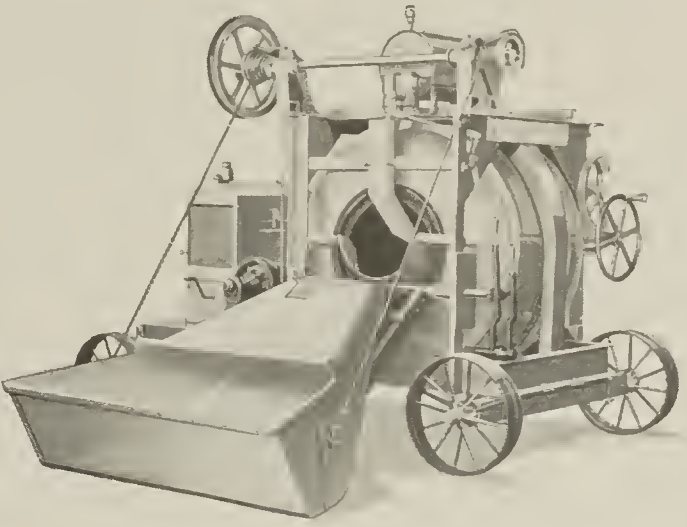
Regular mountings of Knickerbocker Mixers include skids and trucks. For details, see complete specifications on page 25.

Crosswise Trucks

In an increasing number of instances, contractors find their work simplified by a mounting affording end discharge. The 7-S, 10-S and 14-S Knickerbockers may be equipped with the crosswise trucks and knuckle axles shown below.



Crosswise Trucks



7-S with Power Loader

The Knickerbocker 7-S

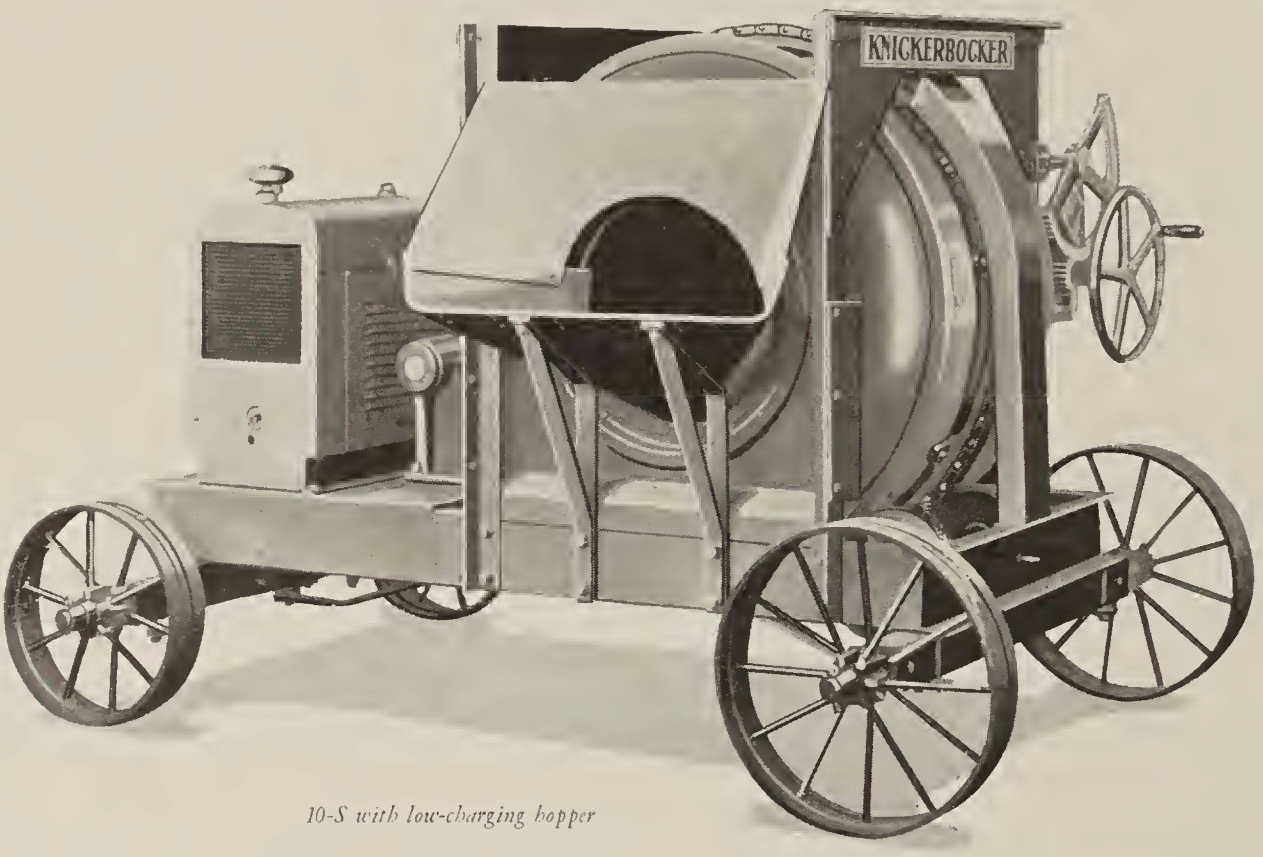
IN the foregoing pages of this catalog an effort has been made to explain thoroughly a few of the important details of Knickerbocker design and construction that apply generally to the entire range of sizes.

While chief attention to the reliability of the Knickerbocker has been drawn by the larger sizes, it is important to note that the fundamental features that have made the 21-S and the 28-S such outstanding successes are found in the 7-S, the 10-S and the 14-S.

On this and the two following pages will be found illustrations of these three smaller sizes. They are identical in design, differing only in size and weight of parts. The careful buyer will examine specifications closely in this respect, to make sure that he is getting the full value of the size he wants. For comparative size of parts, weight of shafts, gauge of steel and other details, refer to the complete specifications on page 25.

The rigid requirements that will be placed on 1929 concrete make thoroughly modern mixing equipment essential to the construction plant. A mixer that will handle sticky concrete and handle it at a rate that makes mixing profitable is the only answer to the contractor's problem of making money on this feature of his work. The Knickerbocker features that meet the new mixing conditions are discernible in the 7-S just as clearly as in the larger sizes. Knickerbocker policy has never assumed that a small capacity machine must necessarily be a cheaply built machine.

On the 7-S the high drum (47¾ in.) provides a 22-inch charging opening and a 20-inch discharge opening. The drum head on the discharge side is protected by a steel ring welded around the opening. The drum has five mixing blades and nine buckets. Power loader, low charging hopper or batch hopper may be specified. Power is supplied by an 8 h. p. 2-cylinder radiator-cooled LeRoi engine or a 5 h. p. electric motor.



10-S with low-charging hopper

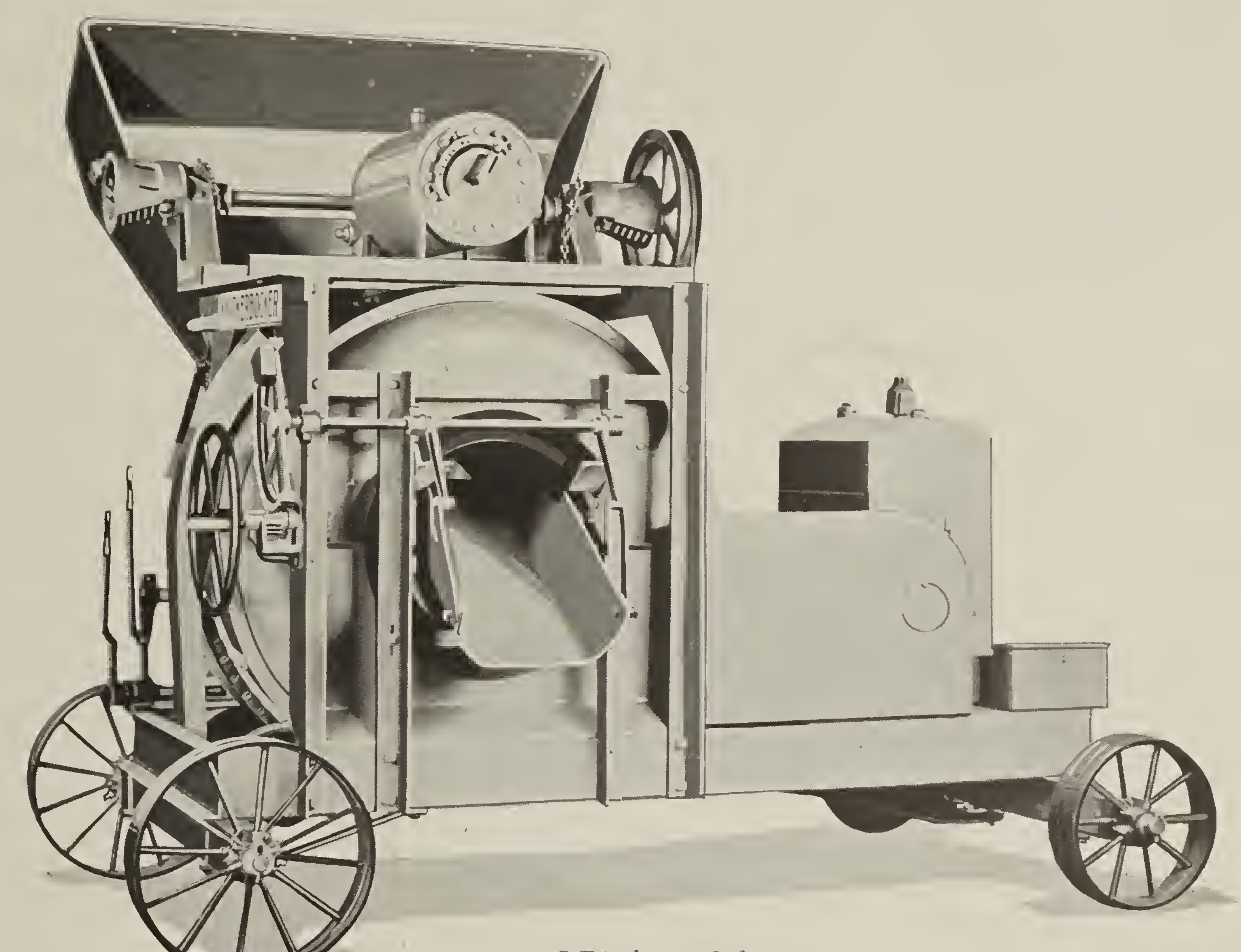
The Knickerbocker 10-S

THE demand on the part of engineers for a longer mixing period has brought the 10-S size into a position of importance. Many contractors who from habit have, on jobs of a certain size, been depending upon 7-S equipment have been puzzled by the problem of giving each batch the required time in the mixing drum and still pouring the accustomed yardage each day.

The design features on the Knickerbocker which cut the time of charging and discharging have solved a part of the problem. A rapidly growing number of contractors have found it profitable to depend more upon the 10-S size for the average small job, thus eliminating all question of meeting both specifications and pouring schedules.

The relation of drum height to drum length, important on all Knickerbocker models, is especially evident on the 10-S. The high drum enables the machine to handle easily the sticky, plastic concrete which is the result of the water-cement ratio proportioning formula. The 24-inch charging opening and the steep pitch of the loading skip facilitate rapid charging. The 24-inch discharge opening and the steep, wide, rounded discharge chute empties the drum as promptly as a tilting mixer can be discharged.

The 10-S is powered by an 11 h. p. 4-cylinder radiator-cooled LeRoi engine or a 7½ h. p. electric motor.



14-S Discharge Side

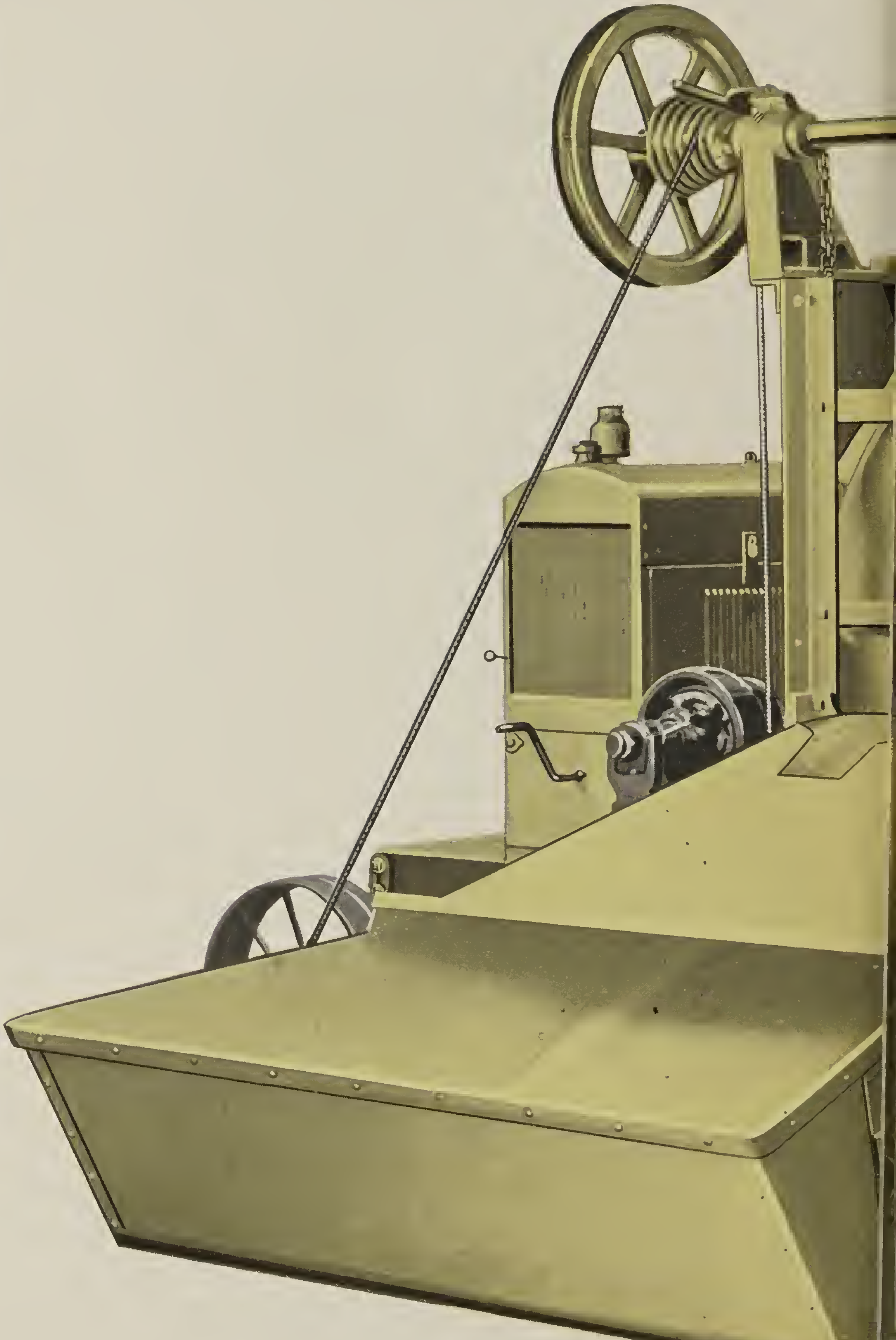
The Knickerbocker 14-S

WITH labor costs an item of constant concern, the fact that a 14-S can be operated with but little more labor than is required for a 10-S has brought many contractors to this larger size.

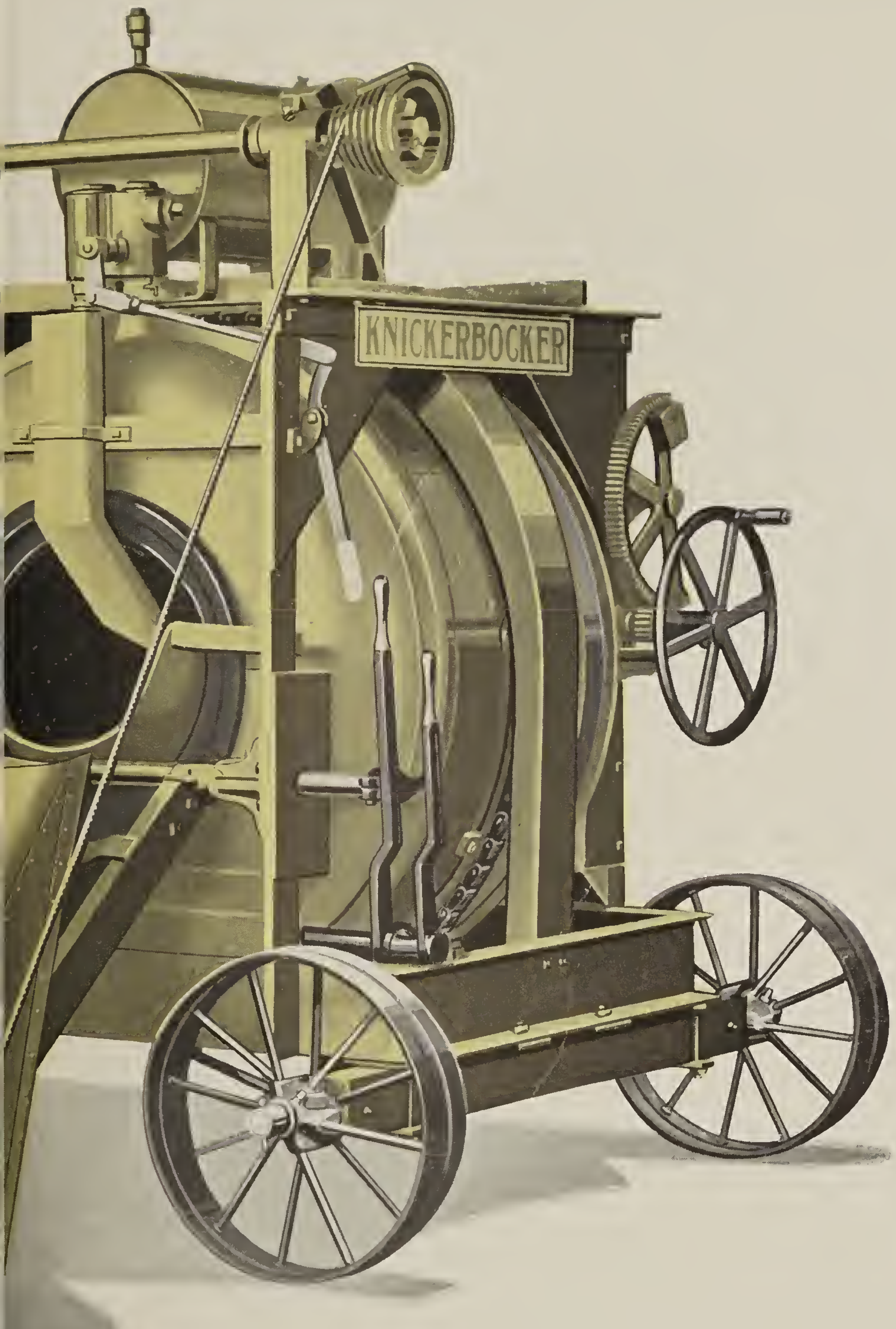
This is especially true with respect to Knickerbockers because the design of the 14-S is identical with that of the smaller units in the line, heavy enough to do a 14-S job yet retaining the advantages of flexibility and easy portability. The profits from the extra yardage possible with the 14-S will quickly pay the small increase in first cost, because the added cost of operating a 14-S over a 10-S is insignificant.

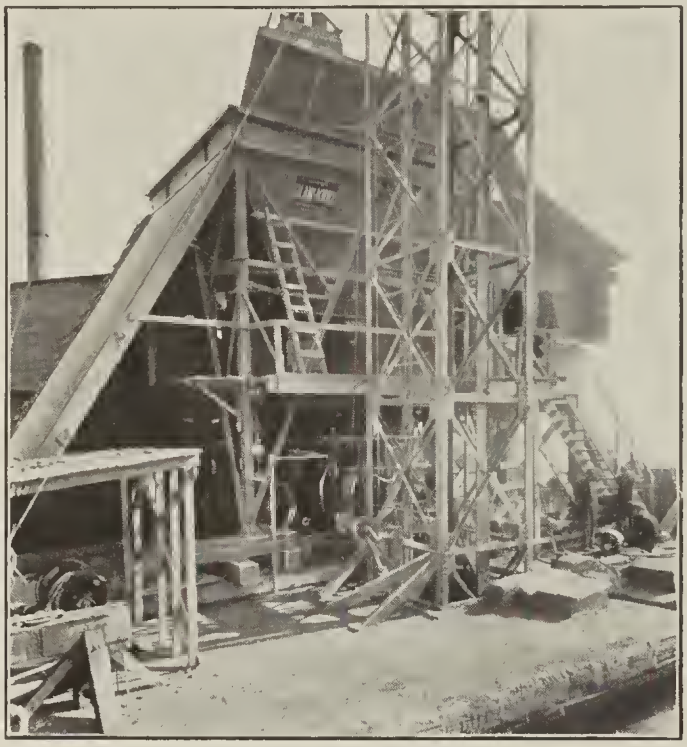
A 15 h. p. 4-cylinder radiator-cooled LeRoi engine or a 10-h. p. electric motor will furnish ample power for this outfit.

The New
Knickerbocker
7-S
10-S 14-S



FOR SUCCESSFUL PERFORMANCE ACC-A





The Knickerbocker 21-S and 28-S

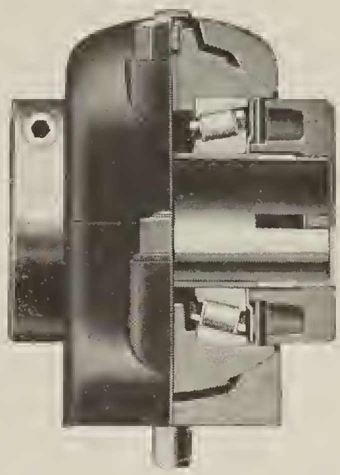
THE quality of reliability which has made the smaller Knickerbockers so popular becomes even more important in larger operations where mixer installations are semi-permanent, where changes in construction plant are expensive and where specifications are so rigidly enforced. The records the Knickerbocker 21-S and 28-S models have made on some of the most important construction projects in the country is impressive. Here it is that careful design and the very highest type of manufacturing efficiency show up in the product and its performance.

As has been emphasized, the design features that enable the Knickerbocker to give such a good account of itself in handling speedily and profitably the kind of concrete called for by modern specifications are common to all models in the Knickerbocker line. However, when the 21-S is reached, certain minor changes are necessary for added strength to insure dependable operation under heavier loads.

On the following pages will be found important improvements dictated by the size of the operations in which these heavy models are called upon to function and certain special equipments that are ordinarily required only on large mixing plants that do not require frequent change of location.

The 21-S and 28-S may be equipped with low-charging hopper, batch hopper or the characteristically wide-mouthed power loader that ascends to a 50 degree pitch. The frame is drilled to make field changes of charging hoppers easy. Power operated discharge is standard equipment.

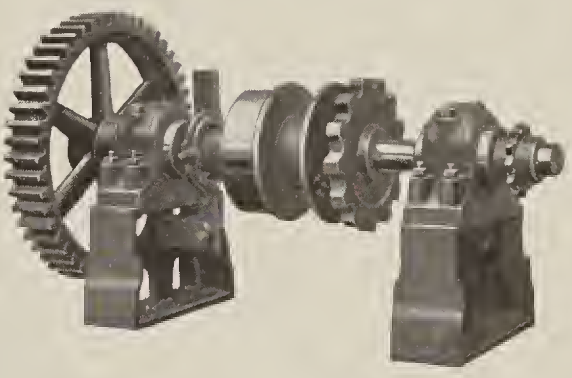
These large sizes of Knickerbockers, in spite of their large drum diameters, have a low center of gravity and an unusually low overall height. They are particularly well adapted for use in bin installations.



Dodge-Timken Roller Bearing

Roller Bearings

We have chosen Dodge-Timken self-aligning ball-and-socket roller bearings for use on the power shaft and trunnion roller shafts of the 21-S and 28-S Knickerbocker mixers. They reduce friction to the vanishing point, keep the moving parts of the machine in perfect alignment and radically reduce lubrication costs, because of their tight leak-proof enclosures, which retain the lubrication and exclude all dirt, dust and grit.

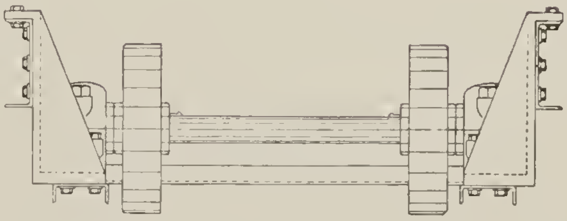


21-S and 28-S Power Shaft Assembly

Trunnion Roller Shaft and Bearings

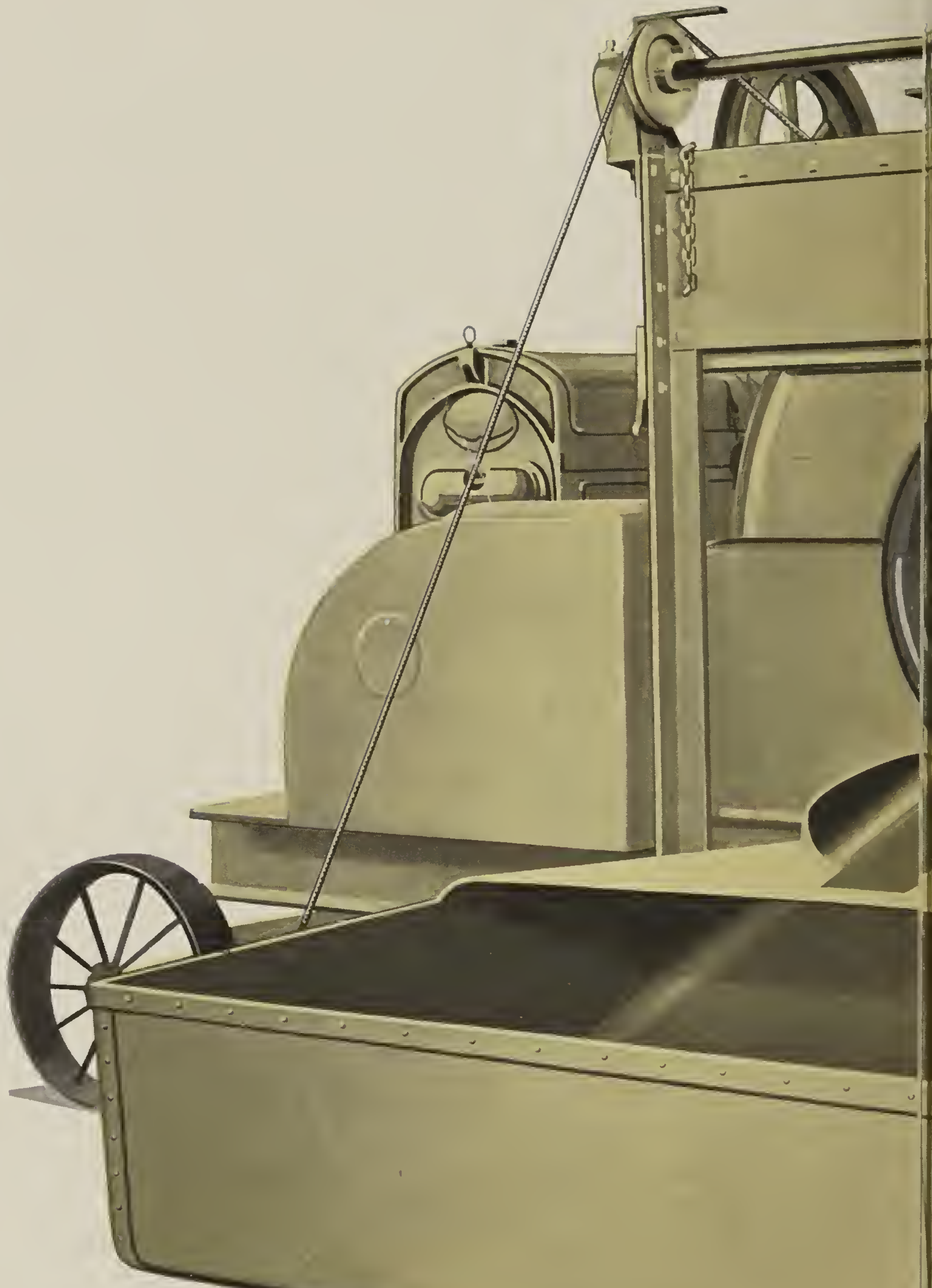
To bring these larger Knickerbocker mixers to the most practical height, we have hung the roller bearing shaft assemblies from the main truck channels in the manner shown by the line drawing on this page.

See illustration of the 28-S on the following page



Trunnion Roller Shaft and Bearing Assembly for 21-S and 28-S

The New Knickerbocker
21-S 28-S



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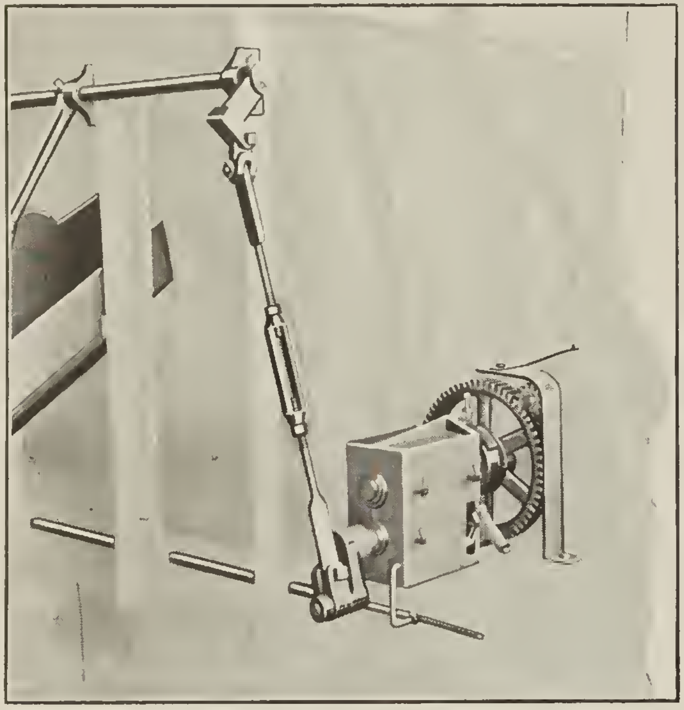
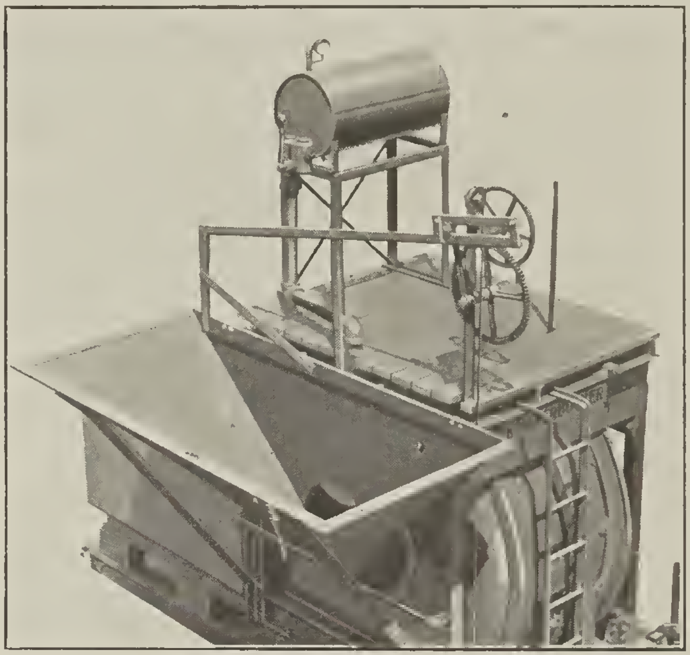


Power Discharge (Gear Housing Removed)



Overhead Control

Power Discharge

THIS feature, which has been made standard equipment on the new 21-S and 28-S, is a positive and extremely simple mechanism for operating the large discharge chute. On standard models it is operated by a lever at the control end of the machine.

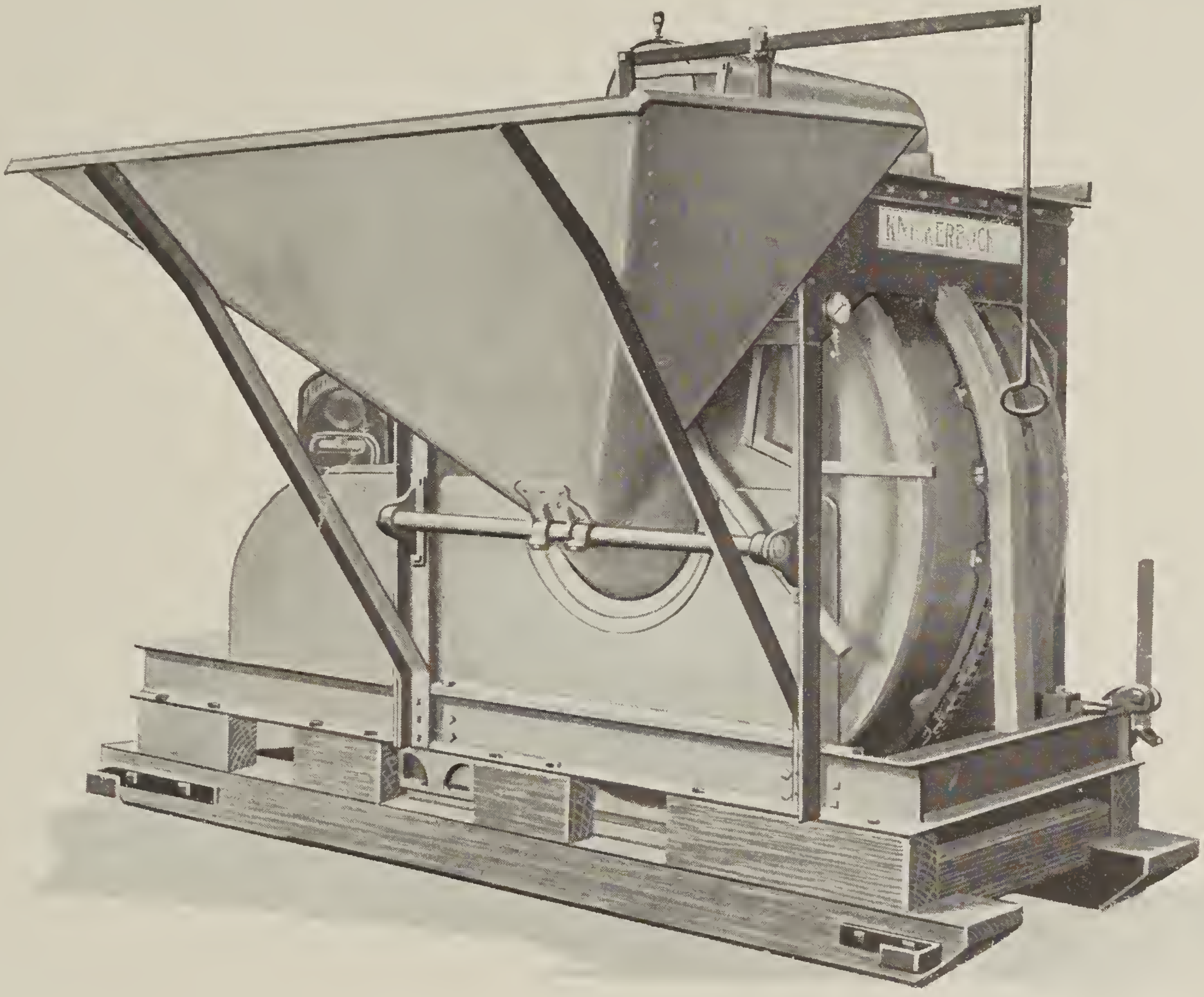
The lever operates a rod housed in a protecting tube extending from the control end of the truck to the power plant end where it engages a simple, positive clutch, made of case-hardened tool steel. Power is transmitted by cut steel spur gears completely housed in a dustproof housing.

Overhead Control

Where conditions require it, either the 21-S or the 28-S may be equipped with overhead platform, with all control levers extended for easy operation from that position.

Heavy Trucks

Truck frames for the larger Knickerbockers are of a weight and construction designed to support the imposed loads with a wide margin of safety. They are built up of 8 inch x 21.25 pound steel channels, welded and gusseted to insure rigidity.



28-S on Skids

THE 21-S and the 28-S are both compact and low. Their design maintains the much desired ratio of drum height to drum length which means so much to thorough mixing and quick discharge and still keeps them close to the ground.

This ground-hugging characteristic gives these models adequate stability, eliminating any tendency to tip and making bracing unnecessary.

The underslung trunnion roller shaft arrangement results in a 21-S with a 71-inch inside drum diameter and an overall height of only 9 feet, 7½ inches, while the 28-S is only 10 feet high with its drum that measures 80 inches inside diameter.

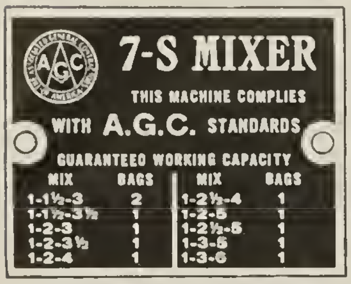
The Capacity of Knickerbocker Mixers

THE quantity of concrete a mixer can deliver per batch, used as a rating for all Knickerbocker mixers, is in accordance with the standards of The Mixer Bureau of the Associated General Contractors, of which bureau The Knickerbocker Company is a member.

A standard table of mixed aggregates and batches derived therefrom has been adopted by the Mixer Bureau. This table, based on 40% voids in the coarse aggregate, 3.8 cubic feet of cement per barrel and not in excess of 1½ gallons of water per cubic foot of mixed concrete, is given below:—

Maximum Capacity of Knickerbocker Mixers in Full Bags per Batch						
Mix Proportions	5-S	7-S	10-S	14-S	21-S	28-S
1-1½-3 . .	1	2	3	4	6	8
1-1½-3½ . .	1	1	2	3	5	7
1-1¾-3½ . .	1	1	2	3	5	7
1-2 -3 . .	1	1	2	3	5	7
1-2 -3½ . .	1	1	2	3	5	7
1-2 -4 . .	1	1	2	3	4	6
1-2½-4 . .	1	1	2	3	4	6
1-2 -5 . .	½	1	2	2	4	6
1-2½-5 . .	½	1	1	2	4	5
1-3 -5 . .	½	1	1	2	3	5
1-3 -6 . .	½	1	1	2	3	4

Resultant Mixed Concrete in Cubic Feet						
Mix Proportions	5-S	7-S	10-S	14-S	21-S	28-S
1-1½-3 . .	3.55	7.10	10.65	14.20	21.30	28.40
1-1½-3½ . .	3.86	3.86	7.72	11.58	19.30	27.02
1-1¾-3½ . .	4.05	4.05	8.10	12.15	20.25	28.35
1-2 -3 . .	3.89	3.89	7.78	11.67	19.45	27.23
1-2 -3½ . .	4.20	4.20	8.40	12.60	21.00	29.40
1-2 -4 . .	4.52	4.52	9.04	13.56	18.08	27.12
1-2½-4 . .	4.85	4.85	9.70	14.55	19.40	29.10
1-2 -5 . .	2.57	5.13	10.26	15.38	20.52	30.78
1-2½-5 . .	2.74	5.47	5.47	10.94	21.88	27.35
1-3 -5 . .	2.92	5.83	5.83	11.66	17.49	29.15
1-3 -6 . .	3.25	6.50	6.50	13.00	19.50	26.00



7-S MIXER

THIS MACHINE COMPLIES WITH A.G.C. STANDARDS

GUARANTEED WORKING CAPACITY

MIX	BAGS	MIX	BAGS
1-1½-3	2	1-2½-4	1
1-1½-3½	1	1-2-5	1
1-2-3	1	1-2½-5	1
1-2-3½	1	1-3-5	1
1-2-4	1	1-3-6	1

As members of The Mixer Bureau of The Associated General Contractors of America, The Knickerbocker Company is authorized to attach this brass plate to each concrete mixer it manufactures. The plate specifies the rating of the mixer according to A. G. C. standards and guarantees to you that the machine will handle the aggregates listed on the plate.

This "Seal of Successful Performance" is the official recognition by the Associated General Contractors of the worth of contractors' equipment. It is awarded only on the basis of service actually rendered to members of the association, and is impressive proof of the ability of such equipment to do its work acceptably. Knickerbocker concrete mixers earned the right to use this seal by consistent and continuous performance up to Association standards.

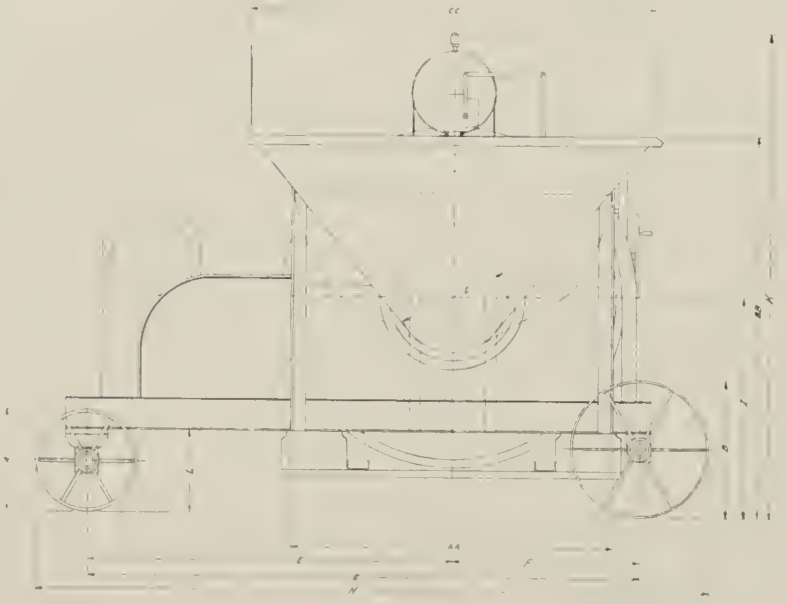
Detail Specifications, Weights, *etc.*

	KNICKERBOCKER 28-S	KNICKERBOCKER 21-S	KNICKERBOCKER 14-S	KNICKERBOCKER 10-S	KNICKERBOCKER 7-S
EQUIPMENT	Power loader, batch hopper or low charging hopper. Positive measuring pressure water tank, 48-gallon capacity. Power discharge standard equipment.	Power loader, batch hopper, low charging hopper. Positive measuring water tank, 36-gallon capacity. Power discharge standard equipment.	Power loader, batch hopper, or low charging hopper. Positive measuring pressure water tank, 26-gallon capacity.	Power loader, batch hopper, or low charging hopper. Positive measuring pressure water tank, 18-gallon capacity.	Power loader, low charger, or batch hopper. Positive measuring pressure water tank, 12-gallon capacity.
POWER	Four cylinder, 4″ x 5″ radiator cooled gasoline engine, developing 35 H. P.; 25 H P. electric motor.	Four cylinder, 4″ x 5″ radiator-cooled gasoline engine, developing 35 H. P.; 20 H. P. electric motor.	15 H. P., 4 cylinder, radiator-cooled Le Roi gasoline engine; 10 H. P. electric motor.	11 H. P., 4-cylinder, radiator-cooled Le Roi gasoline engine; 10 H. P. electric motor. Optional—15 H. P. Le Roi or Novo gasoline engine.	8 H. P. two-cylinder, radiator-cooled Le Roi gasoline engine; 5 H. P. electric motor. Optional—Novo gasoline engine or 11 H. P. Le Roi engine.
MIXING DRUM	Drum heads pressed from ¼″ steel; body of ¼″ .30-.40 carbon plate, lined with sectional wearing plates of .30-.40 high carbon steel which may be easily replaced. Inside dimensions, 80″ diameter, 48″ long; 26″ diameter drum openings on charging and discharge side. Twelve buckets on discharge side, six blades on charging side; buckets and blades of ⅜″ high carbon plate. Revolutions per minute 14.	Drum heads pressed from ¼″ steel; body of ¼″ .30-.40 carbon plate. Inside dimensions 71″ diameter, 46″ long; 26″ diameter drum openings on charging and discharge side. Eleven buckets on discharge side, 5 blades on charging side; buckets and blades of ⅜″ carbon plate. Revolutions per minute, 15.	Drum heads pressed from $\frac{3}{16}$″ steel; body of $\frac{3}{16}$″ plate. Inside dimensions, 58¼″ diameter, 40″ long; 24″ diameter drum openings on charging and discharge side. Ten buckets on discharge side, five blades on charging side. Revolutions per minute, 17.	Drum heads pressed from $\frac{3}{16}$″ steel, body of $\frac{3}{16}$″ plate. Inside dimensions, diameter 53½″, length 35″; 24″ diameter drum openings on charging and discharge side. Ten buckets on discharge side, five blades on charging side. Revolutions per minute, 18½.	Drum heads pressed from $\frac{3}{16}$″ steel, body of $\frac{3}{16}$″ plate. Inside dimensions, diameter 47¾″, length 32″, 22″ opening on charging side, 20″ opening on discharge side. Nine buckets on discharge side, five blades on charging side. Revolutions per minute, 19½.
DISCHARGE CHUTE	20½″ wide, 9¾″ deep, made of ¼″ high carbon plate and lined with ¼″ high carbon plate on end inside of drum.	20½″ wide, 9¾″ deep, made of ¼″ high carbon plate and lined with ¼″ plate on end inside drum.	18″ wide, 7¾″ deep. Made of ¼″ high carbon plate.	18″ wide, 7¾″ deep. Made of ¼″ high carbon plate.	15⅜″ wide, 5″ deep. Made of ¼″ high carbon plate.
TRUNNION ROLLERS (Faces chilled and ground, keyed to shafts)	17″ diameter, 4½″ face.	15¼″ diameter, 3½″ face.	12⅛″ diameter, 3½″ face.	12⅛″ diameter, 2¾″ face.	12⅛″ diameter, 2½″ face.
SHAFTS AND BEARINGS (All Shafts of turned and polished steel)	Trunnion roller shafts 2$\frac{7}{16}$″ diameter, power shaft 2$\frac{15}{16}$″ diameter. All bearings self aligning ball-and-socket Dodge-Timken Bearings.	Trunnion Roller Shafts 2$\frac{7}{16}$″ diameter, power shaft 2$\frac{11}{16}$″ diameter. All bearings self-aligning ball-and-socket Dodge-Timken bearings.	Trunnion Roll Shafts 2″ diameter, high carbon turned and polished steel, running in Hyatt Bearings 5″ long. Power shaft 2¼″ diameter high carbon turned and polished steel, running in Hyatt bearings 6″ long. Trunnion roll and power shaft bearings housed in line-bored, one piece cast brackets, insuring perfect rigidity and alignment of bearings. Ample grease reservoirs are provided for each bearing. All other shafting turned and polished carbon steel, running in babbitted bearings.	Trunnion Roll Shafts 1$\frac{11}{16}$″ diameter, high carbon turned and polished steel, running in Hyatt bearings 5″ long. Power shaft 2¼″ diameter high carbon turned and polished steel, running in Hyatt bearings 4″ long. Trunnion roll and power shaft bearings housed in line-bored, one piece cast brackets, insuring perfect rigidity and alignment of bearings. Ample grease reservoirs are provided for each bearing. All shafts other than trunnion roll and power shafts are of turned and polished carbon steel, running in babbitted bearings.	Trunnion Roll Shafts 1$\frac{11}{16}$″ diameter high carbon turned and polished steel, running in Hyatt bearings 5″ long. Power shaft 2¼″ diameter high carbon turned and polished steel, running in Hyatt bearings 4″ long. Trunnion roll and power shaft bearings housed in line-bored, one piece cast brackets, insuring perfect rigidity and alignment of bearings. Ample grease reservoirs are provided for each bearing. All shafts other than trunnion roll and power shafts are of turned and polished carbon steel, running in babbitted bearings.
TRUCKS	Three point suspension, fifth wheel of cast steel. Frame of 8″ x 21.25 lb. channel and 8″ x 25 lb. I-Beams. Length overall, 171″; width overall, 89″. Front wheels 24″ diameter, 6″ face, rear wheels 32″ diameter, 8″ face. Skids of kiln-dried maple, edged with steel bands.	Three point suspension. fifth wheel of cast steel. Frame of 8″ x 21.25 lb. channels and 8″ x 25 lb. I-Beams. Length overall 163½″, width overall 87″. Front wheels 24″ diameter, 8″ face, rear wheels 32″ diameter, 8″ face. Skids of kiln-dried maple, edged with steel bands.	Three point suspension, fifth wheel of cast steel. Drum roller bearings supported on rigid cradles between sills, relieving sills of any strain due to weight of drum. Frame of 8″ x 16.25 lb. channels. Length overall 129″, width overall 87″. Front wheels 22″ diameter, 5″ face, rear wheels 26″ diameter, 5″ face.	Three point suspension. Drum roller bearings supported on rigid cradles between sills, relieving sills of any strain due to weight of drum. Frame of 7″ x 12.25 lb. channels. Front wheels 22″ diameter, 5″ face, rear wheels 26″ diameter, 5″ face. Overall length 115″, overall width 77″.	Three point suspension. Drum roller bearings supported on rigid cradles between sills, relieving sills of any strain due to weight of drum. Frame of 7″ channels. Front wheels 22″ diameter, 5″ face, rear wheels 26″ diameter, 5″ face. Overall length 108″, overall width 72″.
WEIGHTS	On skids with power loader, no power .... 11,500 lbs. On skids with batch hopper, no power .... 10,000 lbs. On skids with low charging hopper, no power .... 9,400 lbs. For gasoline engine, housed, add .... 1,375 lbs. For A. C. motor, housed, add .... 1,340 lbs. For D. C. motor, housed, add .... 1,740 lbs. For Water Tank, add .... 395 lbs. For trucks, add .... 875 lbs.	On skids with power loader, no power .... 9,245 lbs. On skids with batch hopper, no power .... 8,280 lbs. On skids with low charging hopper, no power .... 7,730 lbs. For gasoline engine, housed, add .... 1,375 lbs. For A. C. motor, housed, add .... 1,150 lbs. For D. C. motor, housed, add .... 1,575 lbs. For Water Tank, add .... 345 lbs. For trucks, add .... 875 lbs.	On trucks with power loader, no power .... 6,790 lbs. On trucks with batch hopper, no power .... 5,800 lbs. On trucks with low charging hopper, no power .... 5,400 lbs. For Le Roi gasoline engine, housed, add 800 lbs. For A. C. motor, add .... 680 lbs. For D. C. motor, add .... 1,400 lbs. For water tank, add .... 345 lbs. For skids, deduct .... 225 lbs.	On trucks with power loader, no power .... 5,045 lbs. On trucks with batch hopper, no power .... 4,670 lbs. On trucks with low charging hopper, no power .... 4,300 lbs. For 11 H. P. Le Roi engine, housed, add 650 lbs. For 15 H. P. Le Roi engine, housed, add 675 lbs. For A. C. electric motor, housed, add 550 lbs. For D. C. electric motor, housed, add 750 lbs. For water tank, add .... 220 lbs. For skids, deduct .... 200 lbs.	On trucks with power loader, no power .... 4,000 lbs On trucks with batch hopper, no power .... 3,750 lbs. On trucks with low charging hopper, no power .... 3,600 lbs. For 8 H. P. Le Roi engine, housed, add 550 lbs. For 11 H. P. Le Roi engine, housed, add 650 lbs. For A. C. electric motor, housed, add 500 lbs. For D. C. electric motor, housed, add 600 lbs. For water tank, add .... 200 lbs. For skids, deduct .... 200 lbs.

Dimensions

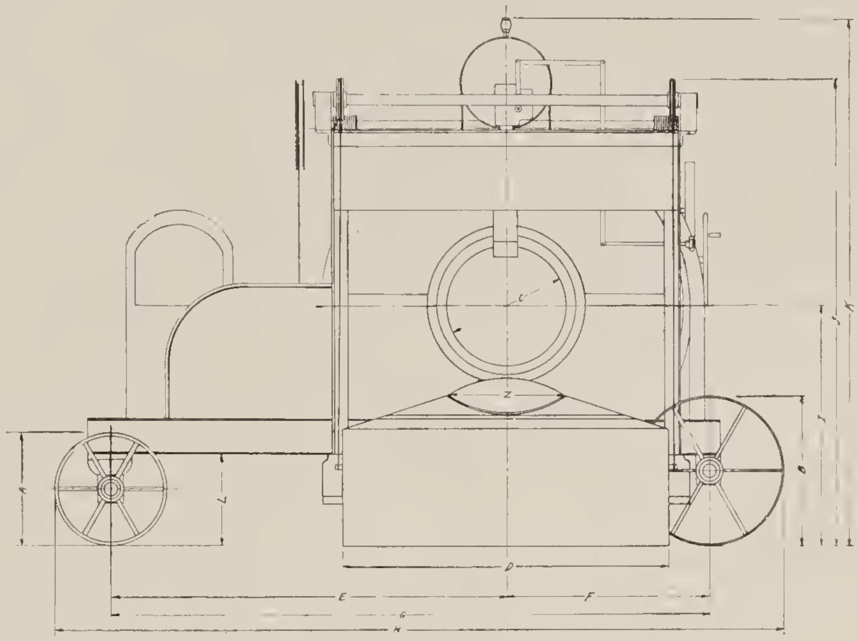
Dimensions in inches of 7-S, 10-S, 14-S, 21-S and 28-S Mixers, on trucks, with power loader, batch hopper or low charging hopper.

	7-S	10-S	14-S	21-S	28-S
A	22	22	22	24	24
B	26	26	26	32	32
C	20	24	24	26	26
D	60	67	72	71½	.....
E	59	64	70	95	98½
F	26	27	30	38½	44½
G	85	91	104	133½	143
H	108	115	129	163¾	171
I	41	45	49	51½	55½
J	88	96	104	99¼	.....
K	94	102	111	115¼	119½
L	15½	16	17	19	19
M	0	0	0	9	9
N	10	14	18	10¾	10¾
O	26½	32	38	33¾	33¾
P	21	23	25	26¾	26¾
Q	54	57	62	62⅜	65¼
R	63	65	75	73¼	76¼
S	72	77	87	87½	90½
T	5	5	5	8	8
U	43	60	70	75	91
V	23	20	20	31	36
W	42	52	60	63	64
X	16½	16	20	25	25
Y	91	111	117	116	128
Z	16	21	21	25	25
AA	39	43½	48	71	71
BB	70	74¾	78¼	92½	101
CC	.....	.....	.....	96	104½
DD	.....	.....	.....	43	50½
EE	.....	.....	.....	52	56
FF	.....	.....	.....	20	23
GG	32	35⅜	40⅜	46½	48½



Drawings are shown for dimensions only, not for accurate design.

For mixers on skids, subtract one-half of dimension "L" from height dimensions to secure proper height; subtract three-fourths of dimension "A" from dimension "H" for overall length.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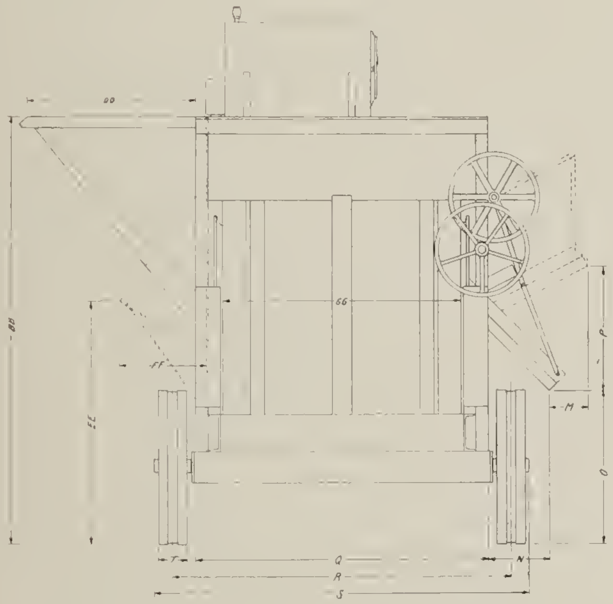
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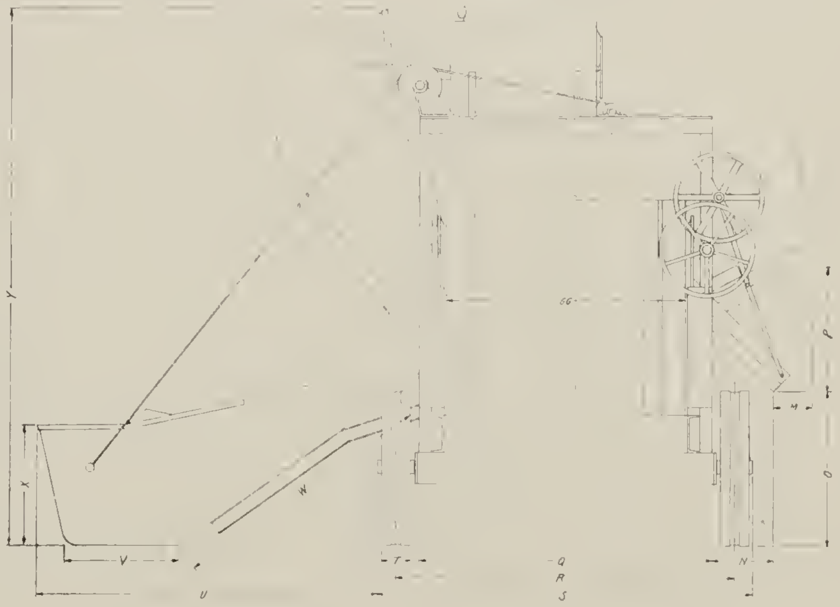
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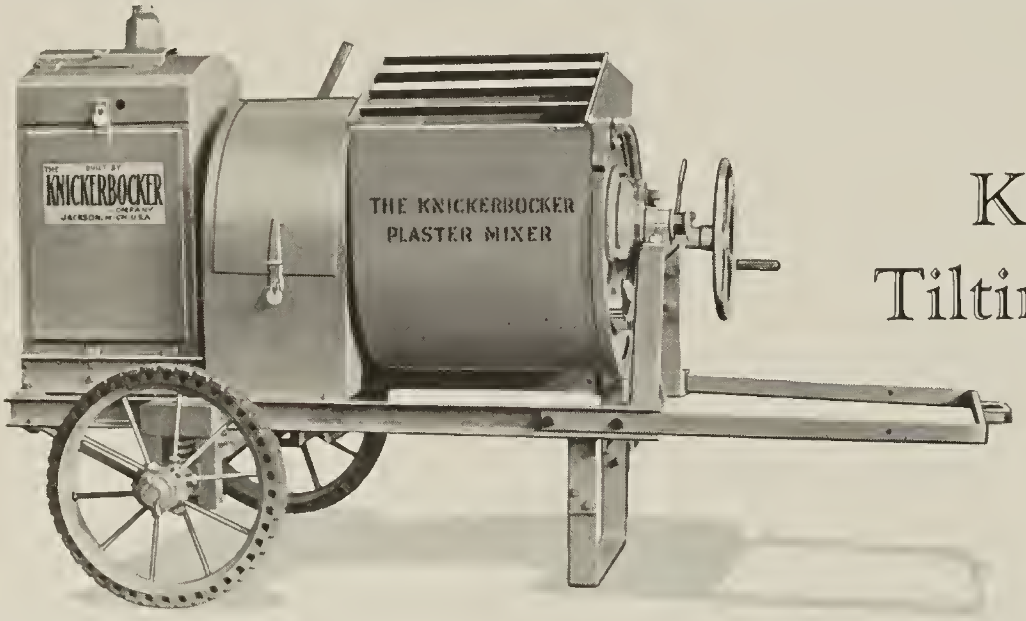


The Knickerbocker Tilting Plaster Mixer No. 4

THIS machine has been designed especially for the Plaster Contractor, but it is being used successfully in mixing mortar, stucco, and structolite.

The heavy steel drum is of a size to take a one-bag batch of gypsum plaster and the number of shovels of sand necessary for perfect plaster. This drum is perfectly counter-balanced to make dumping either way easy and discharge at a height of 19 inches; just right for wheelbarrows.

When plaster is dumped into boxes, the drum may be tilted back to opposite side to discharge water for cleaning.

The drum locks in mixing position and also in discharging position; operating levers are handy; the mixer with tongue slid back may be loaded on a standard 5 ft. 6 in. material elevator and moved from floor to floor; tongue slides beneath the mixer when not in use. There is a grid over top of drum to rest sacks upon and also to protect operator's hands while emptying sacks, making it unnecessary to stop machine while charging.

The mixing flight is driven direct by gears through countershaft, clutch an integral part of the engine—no chains, sprockets, or belts.

Bearings at each end of mixing shaft, support shaft and mixing blades. Weight of loaded drum borne directly by heavy steel frame. Splash plates prevent material from leaking around shaft and keep foreign materials out of bearings.

Brief Specifications—Model No. 4 Plaster Mixer

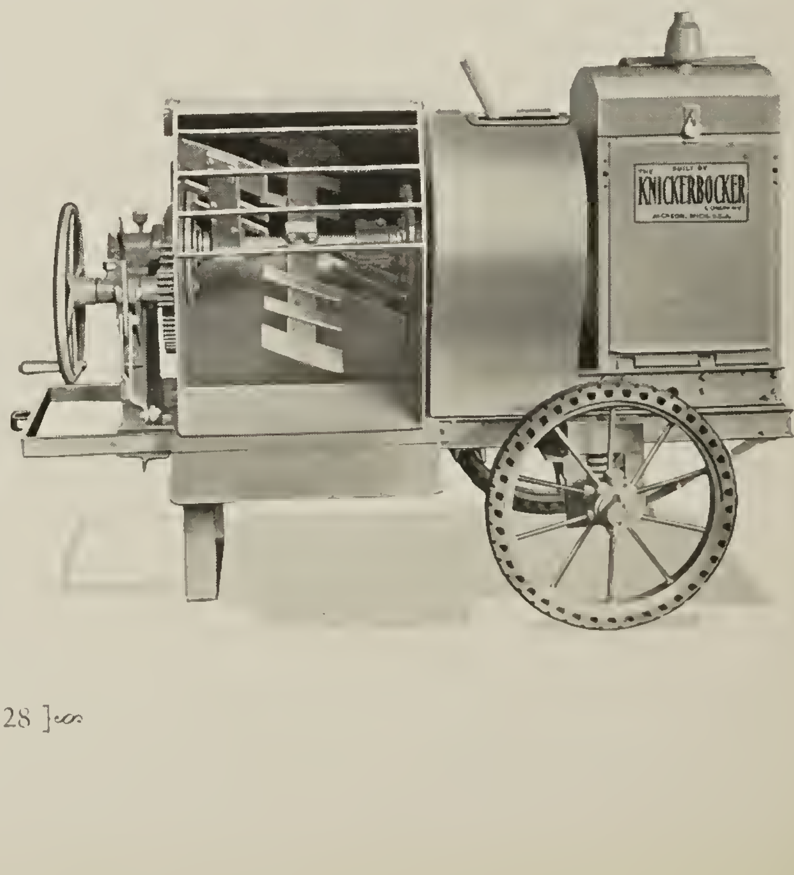
Power—One-cylinder, hopper-cooled Le Roi engine, or 3-horse power electric motor.

Weight—1200 pounds with engine. Length—6 feet 3 inches without tongue, 10 feet 3 inches with tongue. Width—42¼ inches. Height—60 inches.

Wheels—24-inch diameter, 4-inch face steel wheels, 24-inch diameter cushion tired wheels, or Ford wheels with Timken Bearing, demountable rims and 30 x 3½-inch pneumatic tires.

Construction—all-steel electric welded shell, heads of ¼″ plate and shell of No. 10 gauge tank steel, 24 inches long by 30½ inches wide. Discharges 19 inches from ground. Shell can be tipped so that the drum can be cleaned with water and dumped without dumping water into plaster box. Mounted on springs for rapid transit.

Mixing blades of crucible steel with heavy tank steel hoes bolted to blades. Blades and hoes are entirely independent of each other and are interchangeable. All bearings are of special babbitt and lubricated by compression grease cups.



Knickerbocker Plaster, Mortar and Mastic Mixers Nos. 1, 1½, 2

THESE mixers save money on materials by cutting the bulk of lime or gypsum, which costs heavily, and working in a larger bulk of sand, which is relatively cheap. Yet the mixture is improved in quality because it is thoroughly mixed—lumps are mashed out, sand and lime are stirred together so that all the lime does its work; the hair is uniformly distributed and the tint is evenly distributed through the whole for color jobs.

They also save money by cutting the payroll from big hoe gangs to a few men to tend the machines.

One contractor saved enough on material alone in laying 500,000 brick to pay for the No. 2 Mixer, used on his job—his saving in labor was an added profit.

For Mortar—No. 1, No. 1½, No. 2 and No. 4

From 10% to 20% less lime; 20% less tint for color jobs, with uniform distribution of color.

Mortar ready for use without retempering; properly gauged. From 15% to 25% more brick laid per hour. The saving of one man for every ten brick layers—experienced mortar men not necessary.

For Plaster—No. 1 and No. 1½ Non-Tilting Mixers; No. 4 Tilting Mixer

Constant supply of plaster, uniform in consistency, fluffy in texture; will go smoothly on metal lath and surfaces that have little suction. Can be built up without regauging to a thickness of two inches. Will handle plaster with or without hair or fibre, or Portland cement gauged with sand and lime.

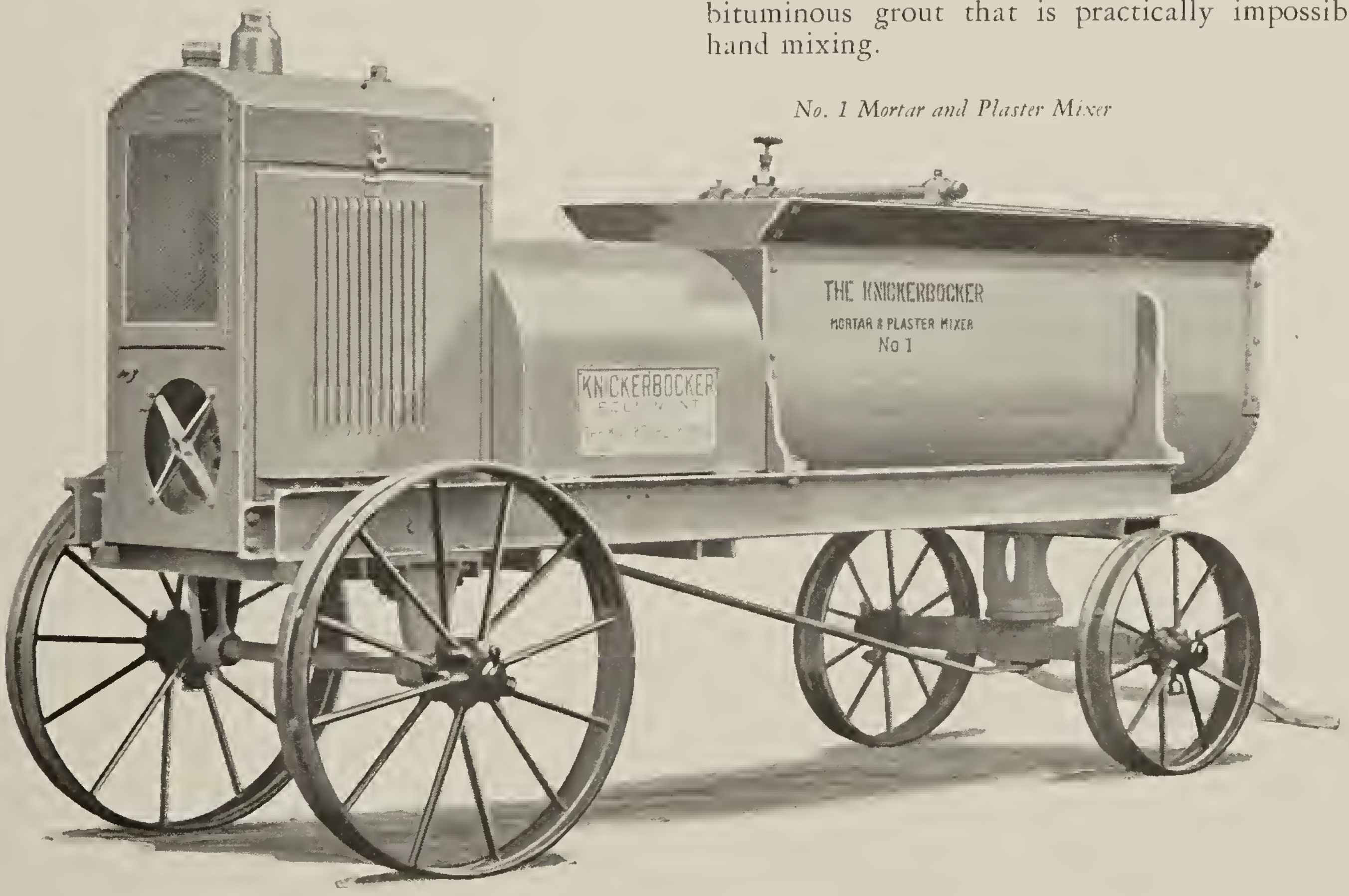
When mixing by hand, from 12 to 16 shovels of sand are usually used to one sack of gypsum plaster—with a Knickerbocker machine, from 16 to 29 shovels of sand are used, according to condition of sand and class of work.

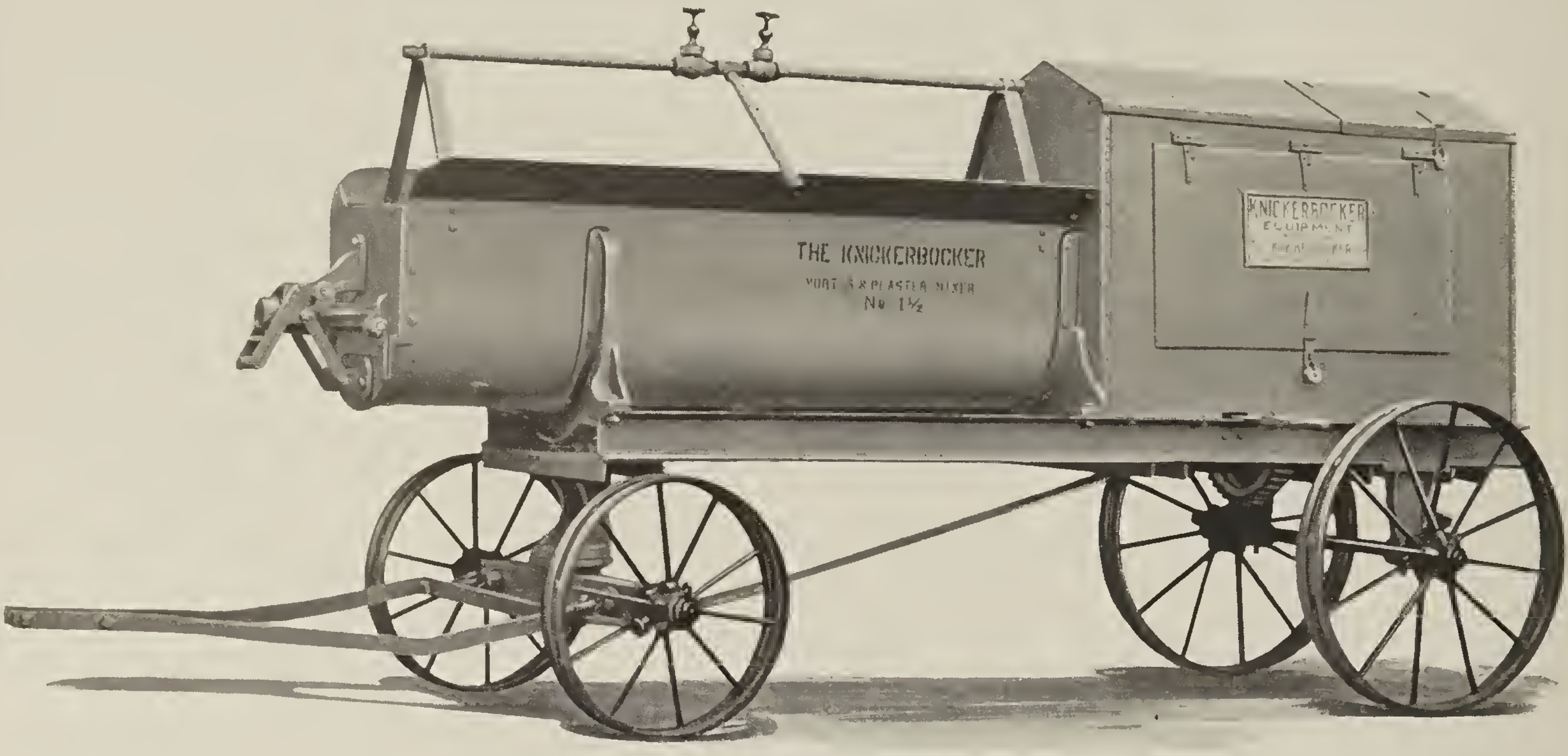
The saving of one man for every eight plasterers; experienced plaster men not necessary.

For Mastic—No. 1, No. 1½, No. 2

On mastic grout, the Eastern Asphalt Company, Philadelphia, report that five men and a Knickerbocker machine lay from 600 to 800 yards of grout surface per day, resulting not only in a considerable saving in labor, but also in the production of a properly proportioned bituminous grout that is practically impossible with hand mixing.

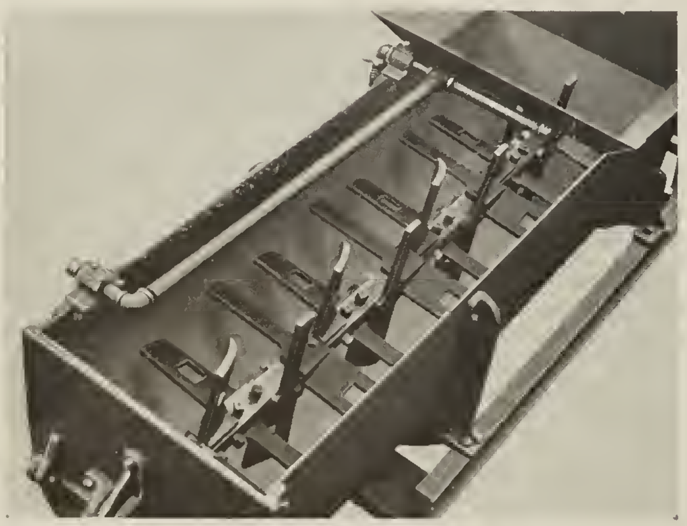
No. 1 Mortar and Plaster Mixer





No. 1½ Mortar and Plaster Mixer

How to Mix by Machine



THE MIXER

Note the hand-hoe design of the steel paddles, fashioned to mash out the lumps, stir the mixture thoroughly, and prevent the accumulation of hair as used in gypsum plaster. The 15 double-end paddles in this assembly are pitched slightly to keep the mixture moving toward the discharge end of the machine

IN using a machine to mix mortar and plaster, the method is somewhat reversed as compared to mixing by hoe. To obtain the best results, charge the mixer as follows:

1. Put into the drum about as much water as will be required for the batch.
2. Then shovel in a part of the sand required.
3. Add the mortar or plaster.
4. Add the balance of the sand.
5. Then add enough water to give the mass the proper consistency.

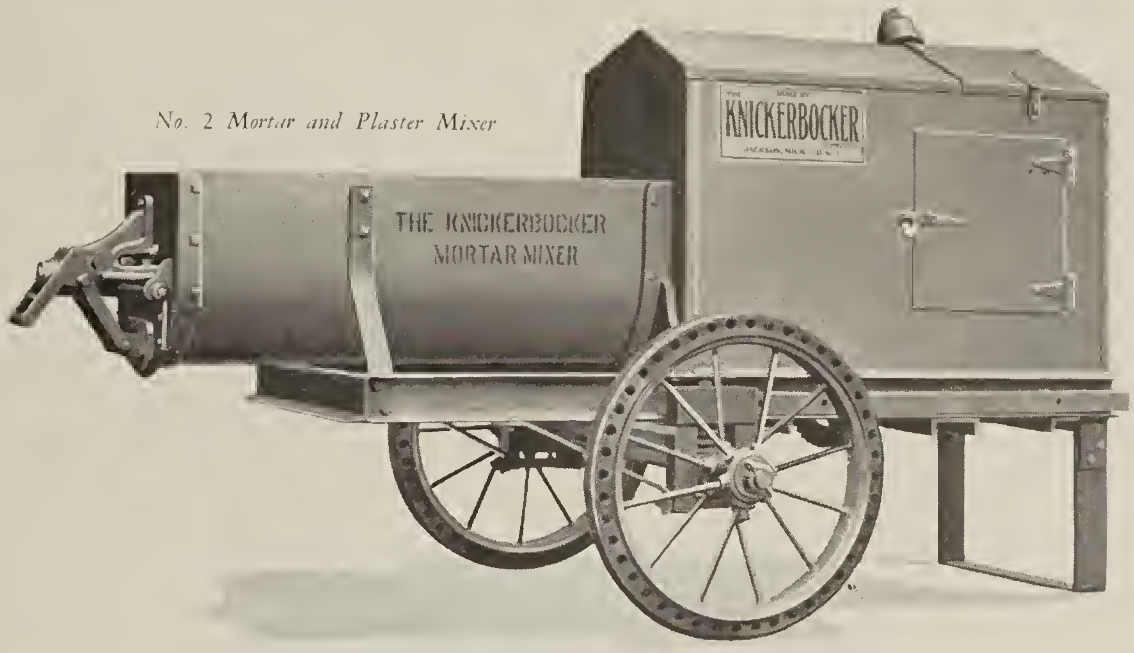
—Discharge and repeat the operation.

If the above simple operation is followed, using the same amount of materials, each and every batch will be of even consistency.

One man, using screened sand, can easily average a batch of plaster every four or five minutes.

See next page for detailed specifications of Knickerbocker Mortar, Plaster and Mastic Mixers

No. 2 Mortar and Plaster Mixer



Specifications

Knickerbocker Plaster, Mortar and Mastic Mixers Nos. 1, 1½, 2

Model No. 1

POWER—Two-cylinder, 8-H.P., radiator cooled LeRoi engine or 5-H.P. electric motor. Weight—2450 pounds on trucks with engine. Length—10′7″. Width—3′11″, and 37″ tread. Height—6′. Wheels—Front, 22″ diameter, 4″ face; rear, 30″ diameter, 4″ face. Construction—All steel, shell $\frac{3}{16}$″ tank steel, 21″ wide, 66″ long, discharge end 24″ above ground line, 16 double-end steel paddles independent of each other and interchangeable.

With one man, this machine will serve 12 to 15 plasterers or 25 to 35 masons, depending upon the character of the work. An extra man doubles the output—two extra men triple the output.

Model No. 1½

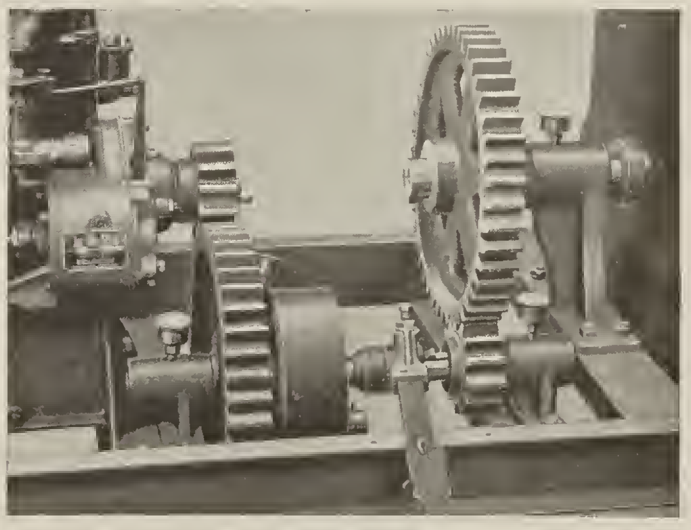
Power—One-cylinder, 5-H.P., hopper-cooled LeRoi engine or 5-H.P. electric motor. Weight—2160 pounds on trucks with engine. Length—10′7″. Width—3′11″ and 37″ tread. Height—6′. Wheels—Front, 22″ diameter, 4″ face; Rear, 30″ diameter, 4″ face. Construction—All steel, shell $\frac{3}{16}$″ tank steel, 15″ wide, 66″ long, discharge end 24″ above ground line. Fourteen double-end steel paddles independent of each other and interchangeable.

Eight to 12 plasterers or 15 to 25 masons are kept supplied by one man operating this model. Two men will supply twice as much mix—three men, three times as much.

Model No. 2

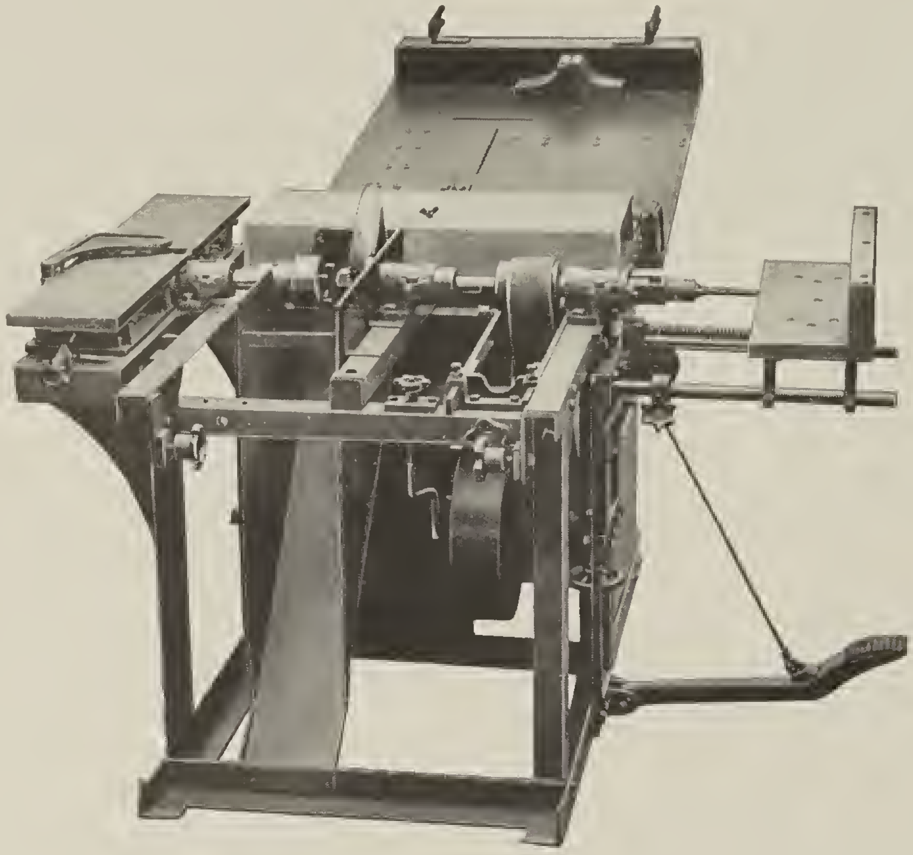
Power—One-cylinder, 4-H.P., hopper-cooled LeRoi engine or 3-H.P. electric motor. Weight—1450 pounds with engine. Length—10′7″; without tongue, 7′6″. Width—3′11″; 37″ tread. Height—52½″. Wheels—30″ diameter, 4″ face. Construction—All steel, shell No. 10 gauge tank steel, 15″ wide, 44″ long, discharge end 19″ above ground line. Ten double-end steel paddles independent of each other and interchangeable. Spring mounted.

The No. 2 (when operated by one man) serves 6 to 10 plasterers or 12 to 20 masons, depending on the character of the work. The machine's output is doubled by putting two men on it instead of one.



THE GEARS

The direct gear drive of Knickerbocker Mortar and Plaster Mixers is simple, easily adjusted, positive and durable. The mixer is controlled by an expansion ring friction-type clutch.



Knickerbocker Woodworker No. 424

CARPENTERS and builders engaged in house and apartment building find countless ways of cutting costs by the use of this light, strong, easily moved machine—a stationary arbor woodworker with a remarkable adaptability.

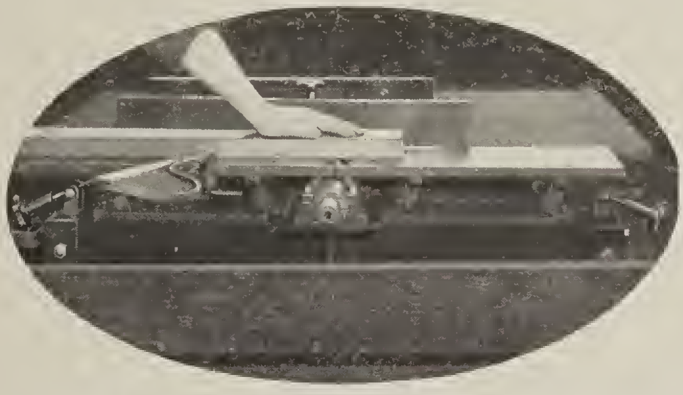
Only 60 inches wide overall

It is a self-contained unit that brings to the job a planing mill of a size to pass through doorways and up stairs easily. And in off seasons it keeps labor employed in the builder's shop.

The frame is of heavy angle steel, welded and gusseted. Top is of sound hardwood, grooved, glued and steel reinforced. Guides and gauges slide in steel grooves set in the wood. Arbors are made of ground and polished shafting, running in long, babbitted bearings. Pulleys are balanced to reduce vibration.

On this machine, 2-inch stock may be ripped—you can rip short stock, such as wedges, up to 4 inches. The standard equipment includes 14-inch crosscut saw, 12-inch rip saw, and gauges for cross-cutting, ripping, mitering, bevel sawing and bevel jointing. Also attachments for mortising, boring, jointing, grooving, rabbeting, grinding, banding, sawing and sanding.

Send for Saw Rig Circular.



The jointer arbor has a bearing on each side of the jointer head. Head machined all over. Cuts up to 6 inches wide. Both tables are adjustable assuring greater accuracy in work

The groover and rabbeter has an adjustable dado 9 inches in diameter. Cuts up to 1¾ inches deep, and from 3/16 inch up to 1¾ inches wide.

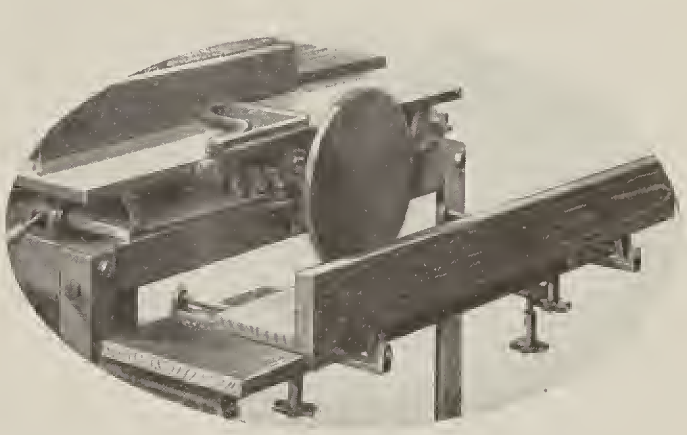
Specifications — No. 424

Height, 34¾ inches. Length of table, 50½ inches. Width of table, 30 inches. Over-all width, with all attachments on, 60 inches. With attachments removed, goes through 2 ft. 8 in. door.

Weight with engine and saws only, 740 pounds; with engine and all attachments, 980 pounds.

Standard equipment, 14-inch crosscut saw, 12 inch ripsaw, gauges and attachments.

4-H.P. LeRoi Gasoline Engine or 3-H.P. Electric Motor.



Papers are easily changed on the 10-inch disc sander

Specifications — No. 5

(See Page 34)

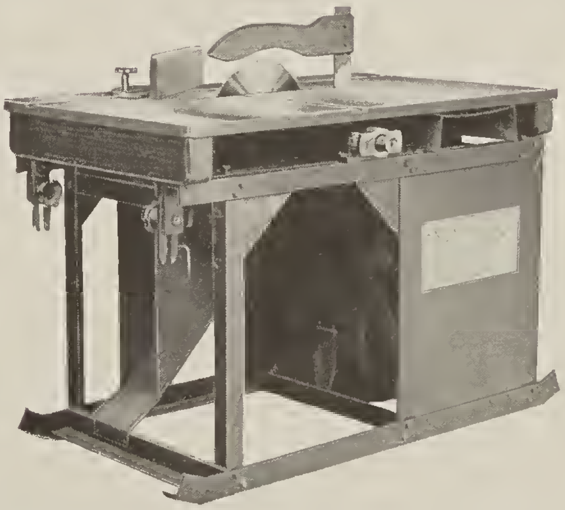
Height, 37½ inches. Length of table, 41½ inches. Width of table, 36 inches. Length of engine skids, 6 feet.

Shipping weight, 950 pounds net.

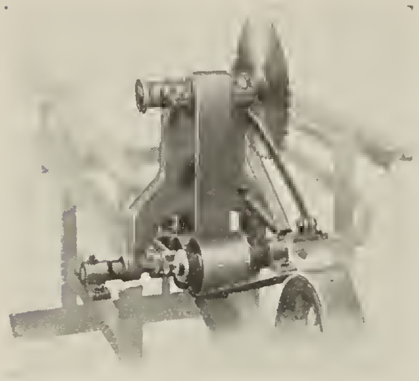
One 20-inch crosscut saw and one 16-inch ripsaw standard equipment. Universal Tool Unit extra.

Ripping capacity, 4-inch lumber. Cross-cutting capacity 1 by 16 inches; 2 by 14; 3 by 13; 4 by 12; 5 by 11; 6 by 9.

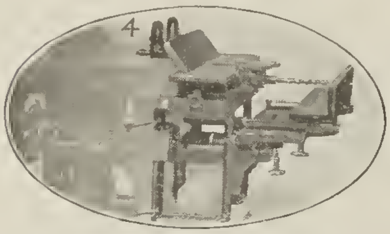
2-Cylinder hopper-cooled LeRoi 8-H.P. Gasoline Engine or 5-H.P. Electric Motor.



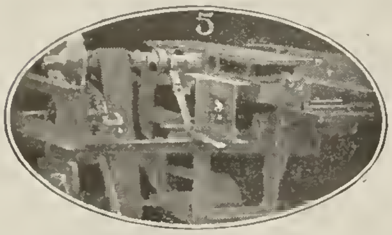
No. 424 Sawing Unit with 4-H. P. Le Roi Gasoline Engine.



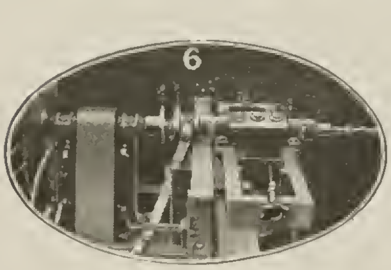
The 4-inch belt delivers the full power of the engine to the saws. Note how it wraps around the saw pulley. The lead is direct from engine pulley to around pulley on center shaft, then over pulley on saw arbor, under idler pulley, and back to engine pulley.



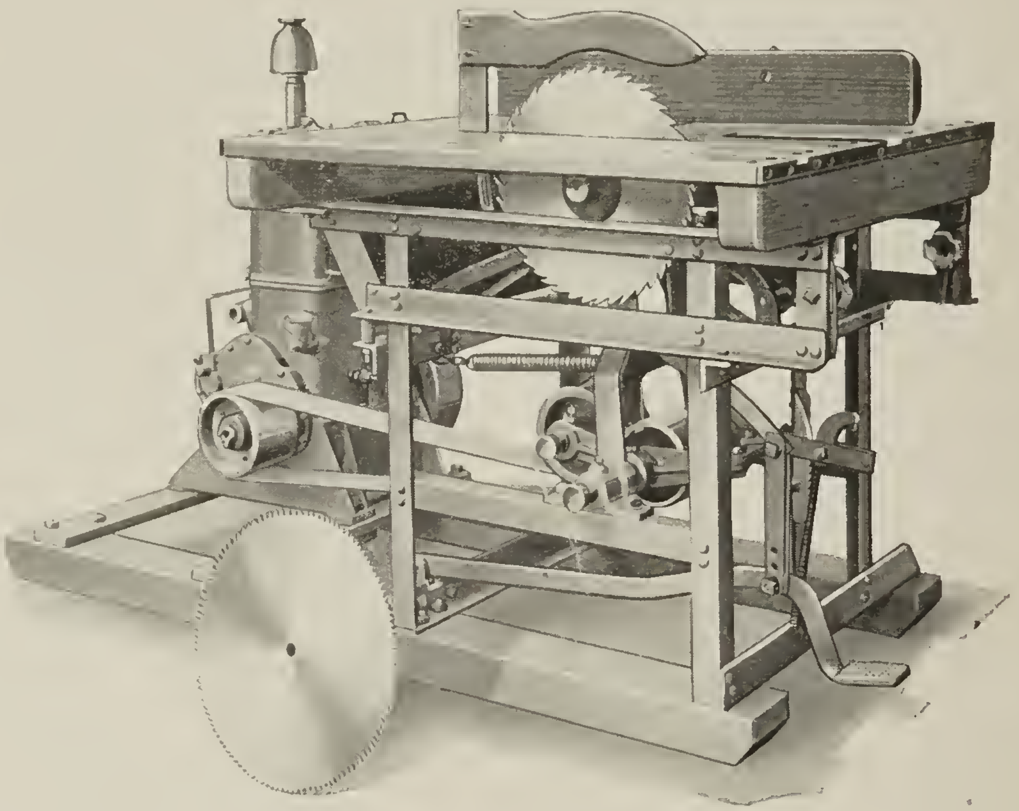
The Universal Tool Unit. It is easily attached to the Combination Swing Cut-off and Ripping Machine with four bolts.



How the clutch operates to connect the Universal Tool Unit to the saw arbor of the Combination Swing Cut-off and Ripping Machine.



The clutch is easily disengaged when the saw is to be operated alone.



Combination Swing Cut-off and Ripping Machine

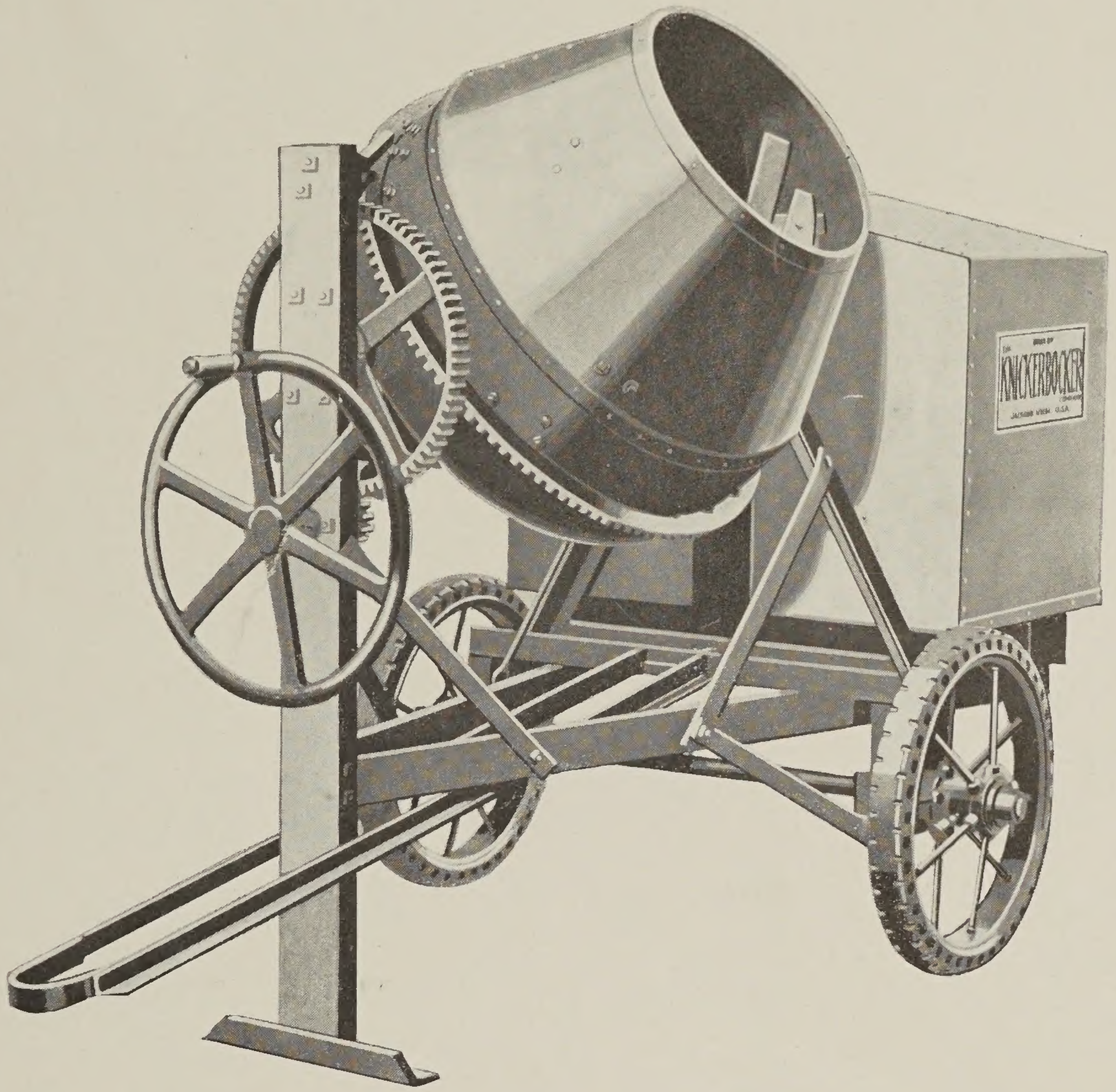
THIS combination swing cut-off and ripping machine is built to serve the contractor who has heavy timbers to handle and wherever used for that purpose has made considerable reductions in the cost of concrete form-work.

It is easily portable and it cross-cuts by the quickest, safest and most accurate method—the saw is swung by a foot lever into the stock, leaving the operator's hands free. For all other operations the arbor is locked and the material is fed to the saw. Safety saw guards are standard equipment on the No. 5 as well as on the No. 424.

Send for Saw Rig Circular.

Knickerbocker Universal Tool Unit

This unit which may be added at any time to our No. 5 Combination Swing Cut-off and Ripping Machine, is composed of a 6-inch jointer with guard; adjustable jointer beds; hollow chisel; mortising and boring attachments with ½-inch, ¾-inch, and 1-inch bits and complete adjustable sliding, boring and sanding table; 10-inch sander; 9-inch diameter dado for grooving and rabbeting, adjustable for widths from $\frac{3}{16}$-inch to 1¾-inches and for depths up to 1¾ inches; 8-inch emery wheel; mandrel; iron frame ready to attach to our own swing frame.



The Knickerbocker 3½-S Trailer Type Tilter

THIS model was introduced in 1928 to serve with a thoroughly dependable tilting mixer those building needs that require a small, easily moved, tub-type machine.

The drum bottom is cast in one piece, of semi-steel to which is bolted a heavy 6-inch steel band. To this band is riveted the cone, reinforced at the top with a tire steel collar ¼-inch x 1¼ inches. Drum diameter, 32 inches. Drum length, 29 inches. Drum opening, 18 inches. Two long and two short mixing blades of heavy tank steel clear the drum sides by 1½ inches.

Positive, flexible drive by malleable pintle chain from 2 h. p. Stover or Fuller & Johnson engine to sprocket on main drive shaft which is a large, turned and polished shaft operating in two dust and grease-sealed New Departure Ball Bearings.

The drum shaft or spindle revolves with the drum and is equipped with two 2½-inch bearings set 7 inches apart with a large Dot-equipped lubricant chamber between them. Drum and shaft easily removed and quickly replaced.

A Timken thrust bearing, set high inside the drum hub, completely sealed from grit and water, takes up the thrust of drum and load when drum is in mixing position.

In discharge position, end thrust is taken up by steel thrust collar keyed and set-screwed to the shaft below the yoke, which in turn operates in a bronze thrust washer.

Write for folder containing complete tilter specifications.

The Knickerbocker Pledge

IT is hoped that those who have read these pages have been impressed with the careful research and experiment that have preceded the actual work of designing Knickerbocker equipment—the efforts the engineers have made to meet the contractor's every problem—the precautions that have been taken to manufacture these machines of sturdy, worthy materials, fabricated in simple fashion.

No effort has been made to dazzle the buyer with extravagant statements nor to belittle competing equipment. It has been kept in mind that conflicting claims are confusing. The contractor in search of new equipment quite frequently finds himself lost in a maze of contradictory statements.

To simplify the problem of wise buying—to remove effectively all doubt—Knickerbocker Equipment is offered on a definite pledge of successful performance. The Pledge is this:

> *Place a Knickerbocker on your work alongside of any similar piece of equipment. Test both out thoroughly. We'll let you be the sole judge as to their comparative merits. Keep the machine that seems to you to be the best investment.*

Isn't that a sane and simple manner of reaching a decision?

The KNICKERBOCKER COMPANY
Established 1883
JACKSON, MICHIGAN, U.S.A.

PRINTED IN U.S.A.

BY FRIESEMA BROS., DETROIT

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